ROUSH CLEANTECH

Ford E-450/E-350 Dual Rear Wheel Cutaway and Stripped Chassis for 138”/158"/176" Wheel Base (including extended frame)

Liquid Propane Auto Gas Fuel System – Aft-Axle Tank

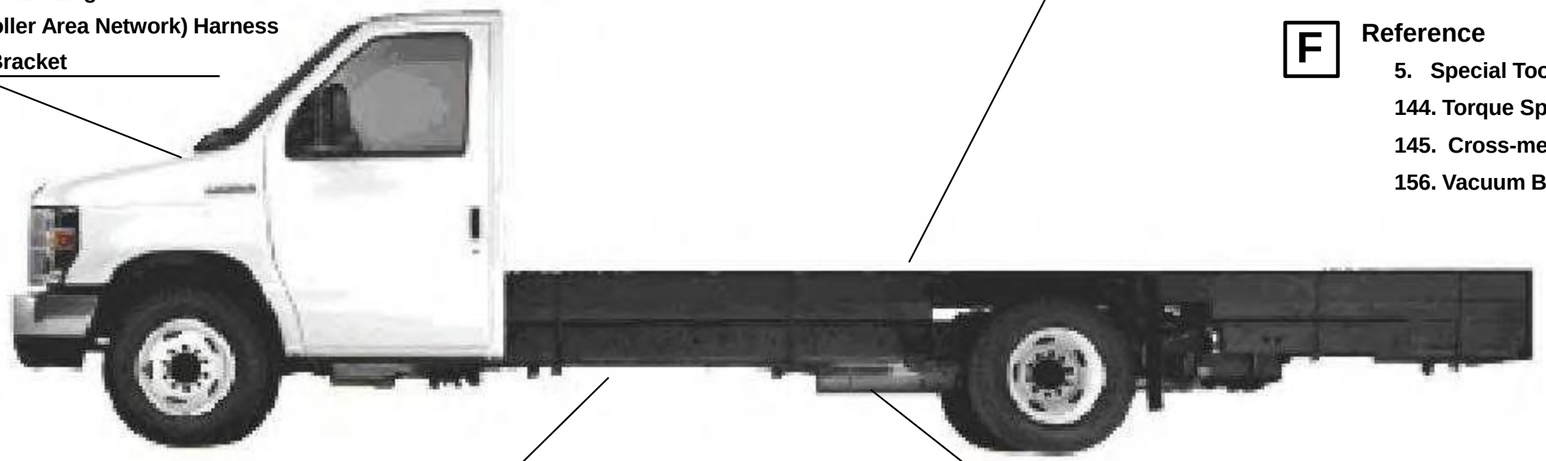
Installation Manual

ATTENTION

Prior to starting the installation of the ROUSH CleanTech propane fuel system please ensure the vehicle has been registered online via the ROUSH Installer Portal. This will automatically generate a request to overnight a VECI label for the vehicle which will be needed to program the Ford PCM with the ROUSH CleanTech propane calibration after the fuel system has been installed.

If any assistance is needed with the registration of the vehicle please contact ROUSH CleanTech at **1-800-59-ROUSH (opt 2)**.

CONTENTS

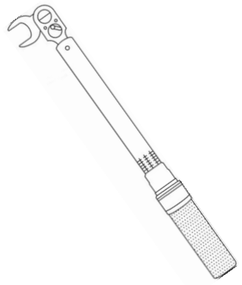


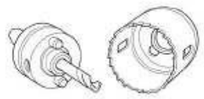
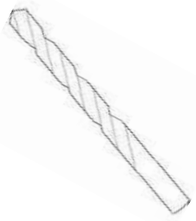
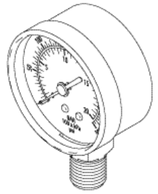
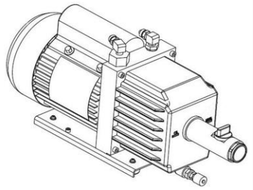
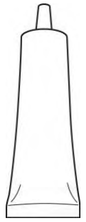
Ford E-350 Cutaway

Ford E-450 Stripped Chassis

Ford E-450 Cutaway

SPECIAL TOOLS

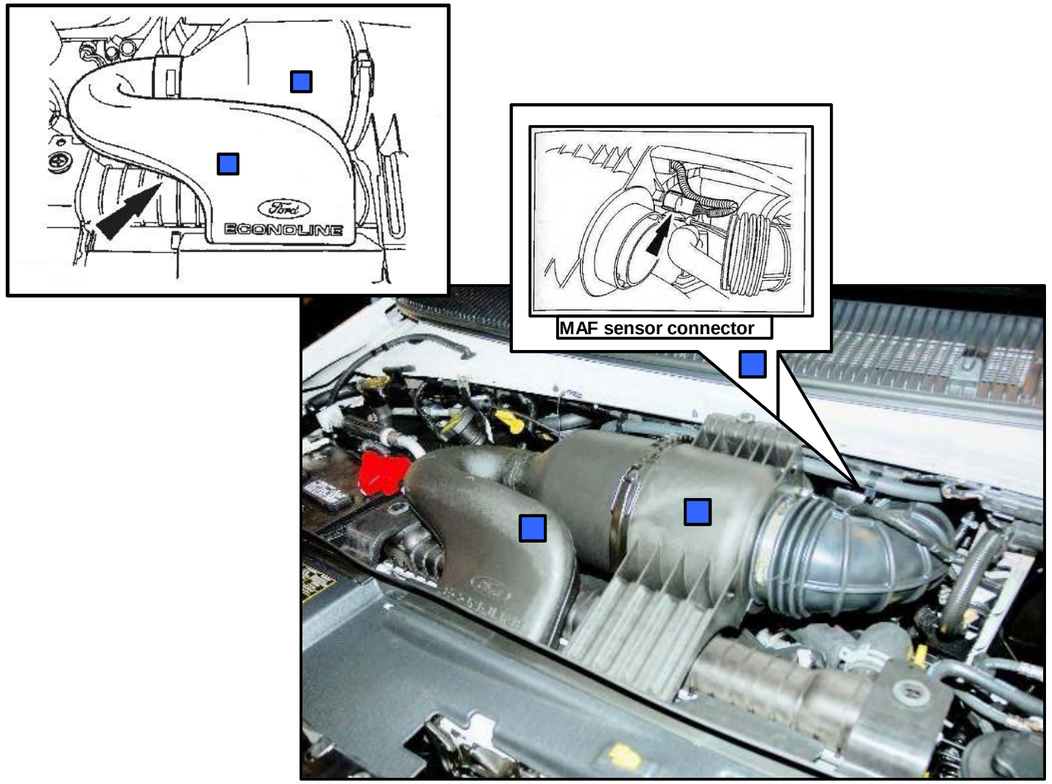
						
Touch-Up Paint	**Liquid Leak Detector**	**Motorcraft Premium Undercoating (PM-25A)**	**Torque Wrenches (22Nm – 200Nm)**	**Gloves (Approved for Propane)**	**J2534 Pass-Thru Device**	**Crowfoot Wrenches**

						
Oetiker Clamp Crimp Tool	**Hole Saw**	**Drill Bits – Various Sizes**	**Vacuum Gauge**	**Vacuum Pump**	**Dielectric Grease**	**Line Wrenches**

Please see end of manual for torque specs

PREPARE VEHICLE FOR BUILD

Note: Threaded fasteners and threaded fuel line connections must be painted marked after they have been torqued to specification.



Instructions

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 and save air intake.

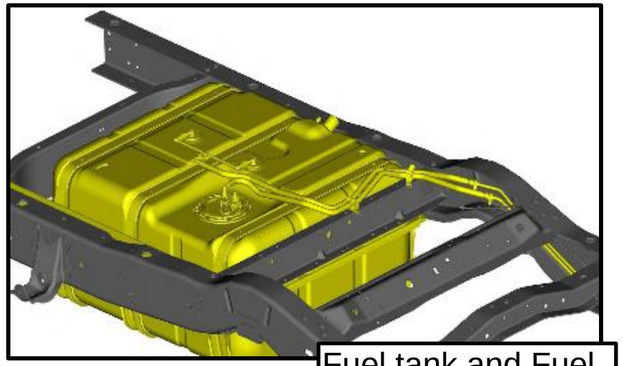
4. Disconnect and remove the battery from the vehicle.

5. From inside the passenger compartment, remove the engine cover.

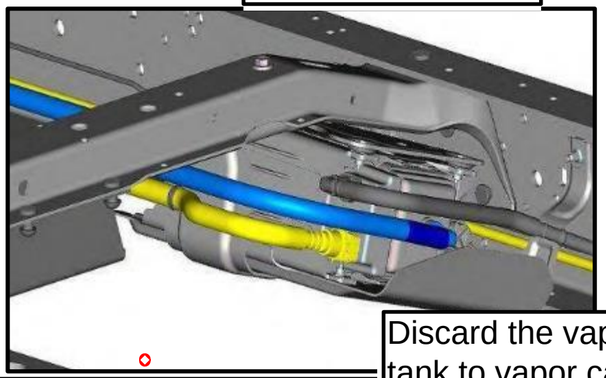
LIST OF FORD GASOLINE COMPONENTS TO REMOVE AND DISCARD

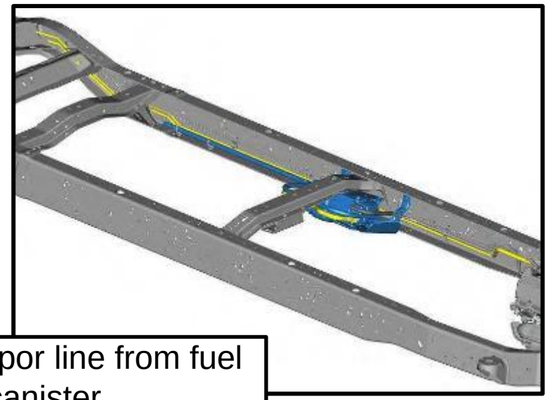
1. Depressurize the fuel rail using the procedure described in the Ford Workshop Manual, Section 310-00, Fuel System, General Information.
2. Remove the OEM Fuel tank
3. Remove the OEM Fuel lines.
4. Remove OEM Vapor lines from Fuel tank to Vapor canister.
5. Remove OEM Filler pipe assembly.
6. Remove OEM fuel rail and injectors.
7. Remove Fasteners and brackets as mentioned wherever necessary.
8. Cut the Ford VMV hose and discard but retain the VMV.

Always refer the Ford Workshop Manual, for a detailed instruction for removing Ford parts.

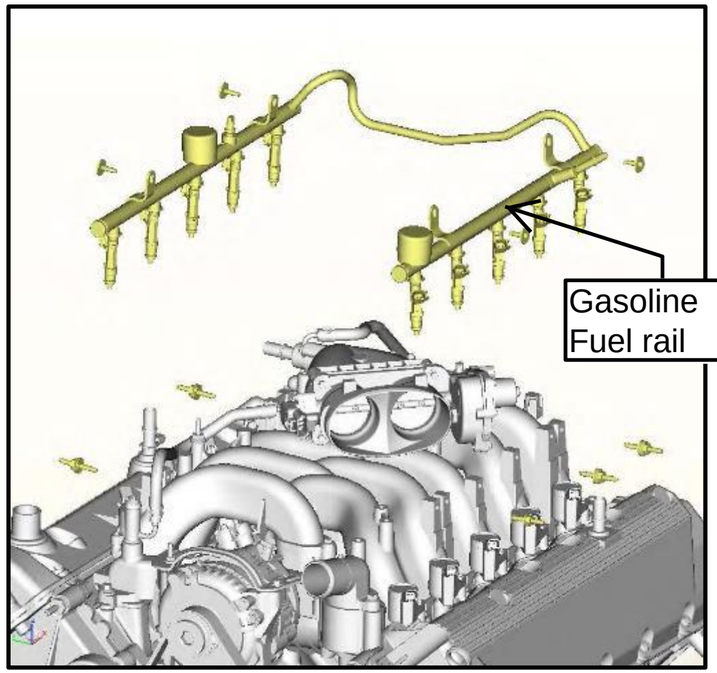


Fuel tank and Fuel lines.

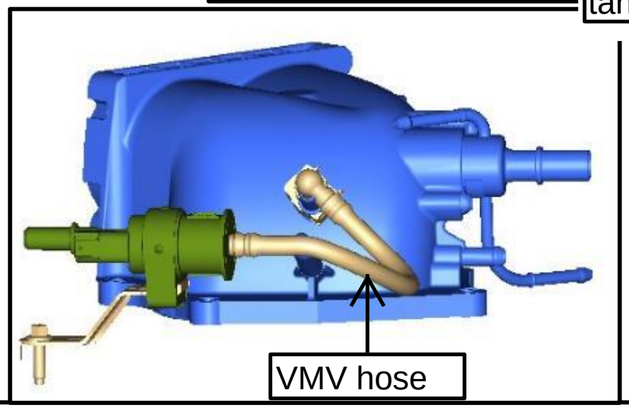




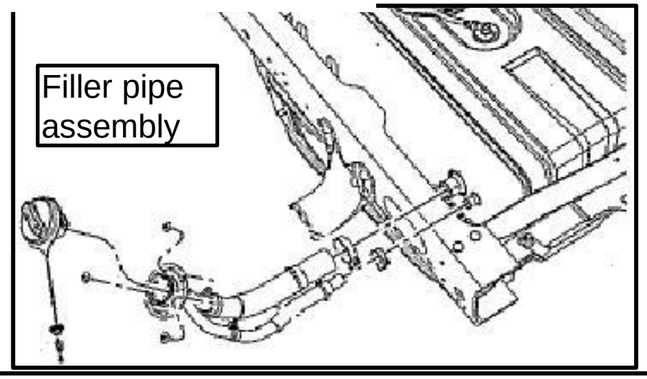
Discard the vapor line from fuel tank to vapor canister



Gasoline Fuel rail



VMV hose

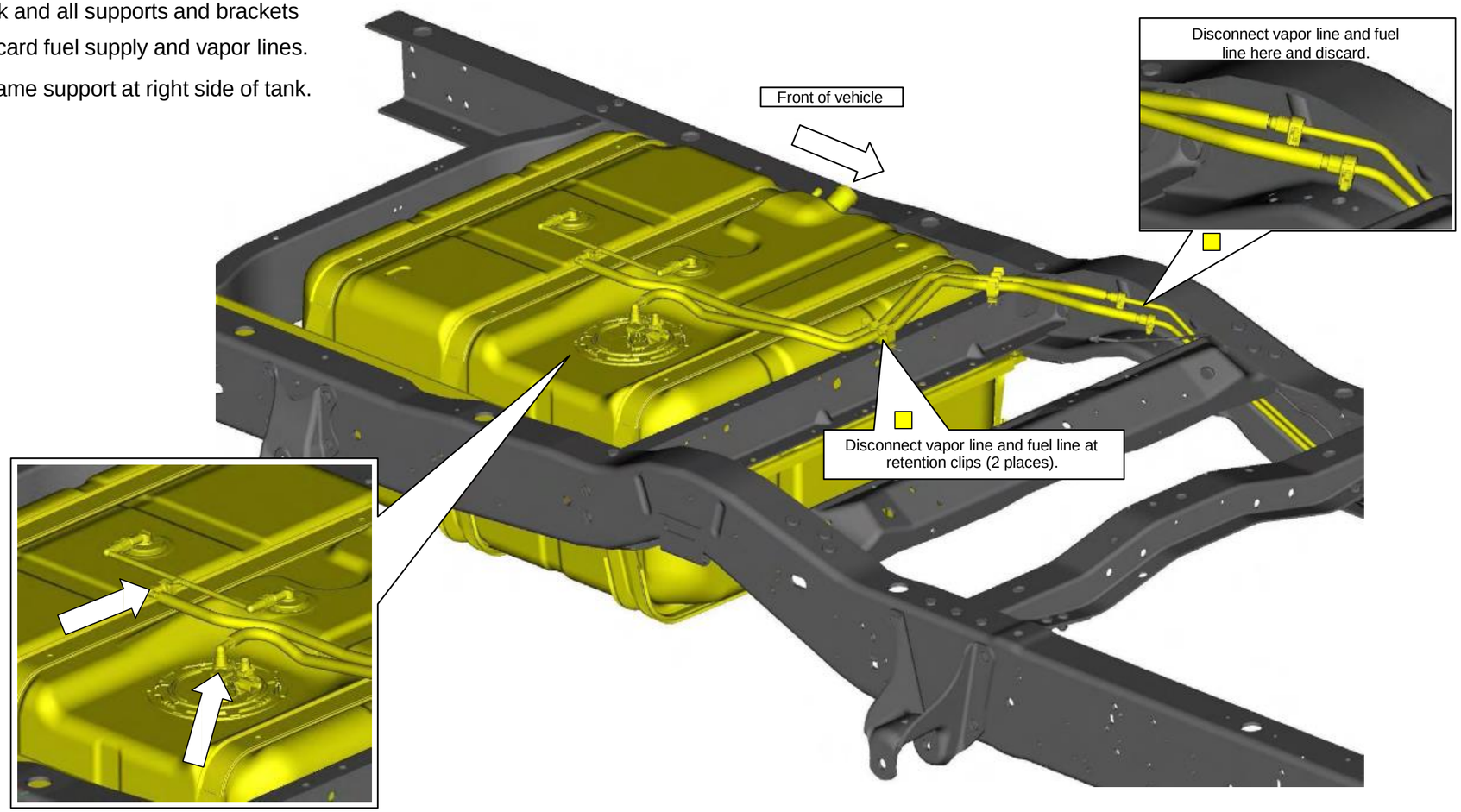


Filler pipe assembly

REMOVING ORIGINAL FUEL TANK

Refer to the Ford Workshop Manual, Section 310-01, Fuel Tank and Lines, for instructions on removing the original fuel tank.
Note: Remove only the fuel lines, do NOT remove the brake lines when following the Ford Workshop Manual procedure.

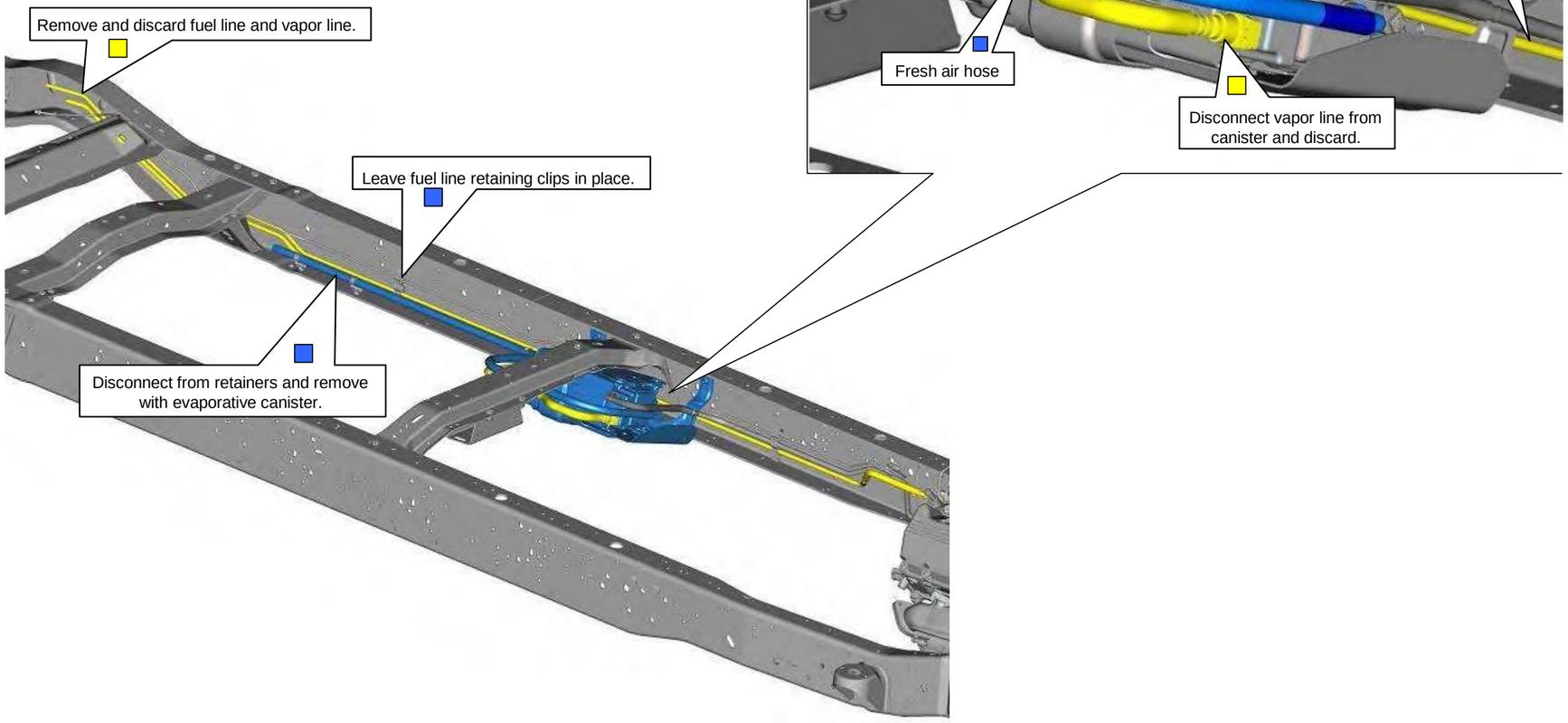
1. Disconnect vapor line and fuel supply line from fittings at tank and frame rail.
2. Remove fuel tank and all supports and brackets
3. Remove and discard fuel supply and vapor lines.
4. Remove inner frame support at right side of tank.



Note- Please save all the fuel line retainers for further use.

REMOVING ORIGINAL REAR FUEL AND VAPOR LINES

1. Remove vapor line from retaining clips on frame rail, disconnect from evaporative canister and discard.
2. Remove evaporative canister and fresh air hose following procedure in **Ford Workshop Manual, Section 303-13**, *Evaporative Emissions.* Disengage the bracket from the frame rail and crossmember. Leave the canister attached to the bracket.
3. Remove gasoline rear fuel supply line from retaining clips. Leave clips in place for new fuel lines.
4. Note- Leave the Forward Vapor line from Canister to Engine as it its.

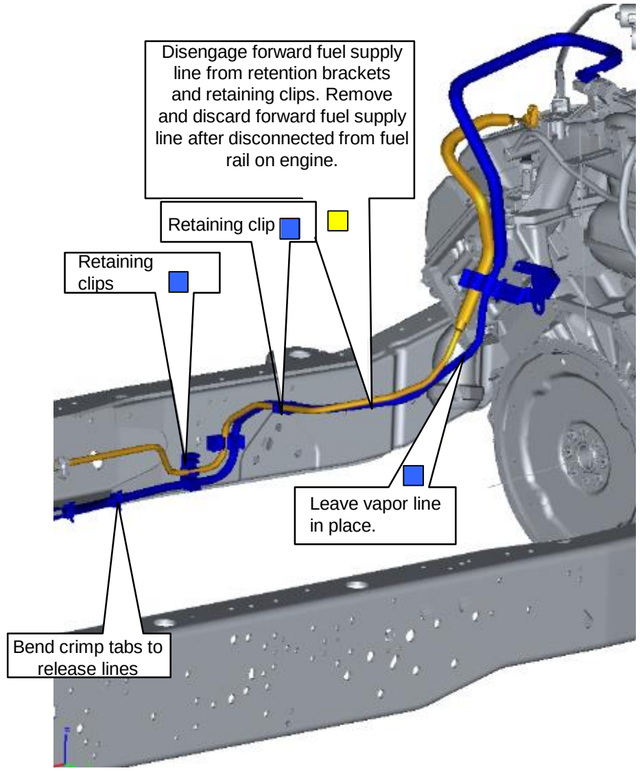


REMOVING ORIGINAL FORWARD FUEL SUPPLY LINE

Refer to the **Ford Workshop Manual, Section 310-01,** Fuel Tank and Lines, for complete instructions for removing the original forward fuel supply line and setting aside the evaporative canister.

If installing this kit on an unfinished vehicle (no box or bed installed), the filler pipe, fuel supply and vapor lines (at tank) can be removed along with the fuel tank.

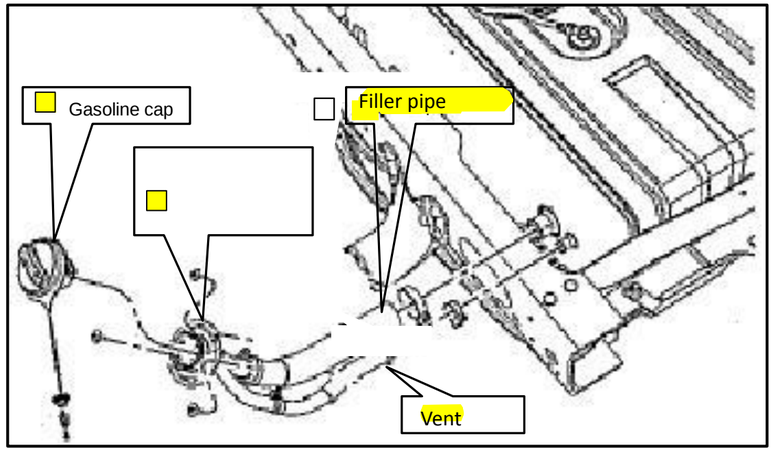
1. Disengage the forward fuel supply line from retention clips, disconnect from fuel rail and discard line.
2. Disconnect the heated exhaust gas oxygen (HEGO) sensor harness and connector from the line bracket at transmission.



REMOVING ORIGINAL FILLER PIPE

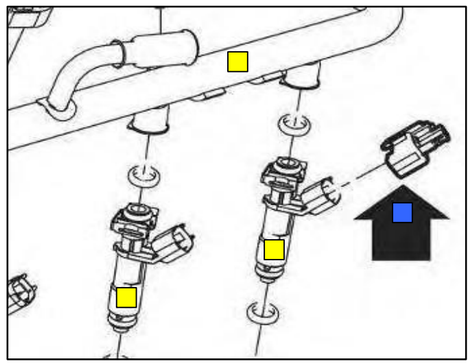
1. Refer to the **Ford Workshop Manual, Section 310-01**, *Fuel Tank and Lines*, for complete instructions for removing the original filler pipe.
2. If installing this kit on an unfinished vehicle (no box or bed installed), the filler pipe, fuel supply and vapor lines (at tank) can be removed along with the fuel tank.

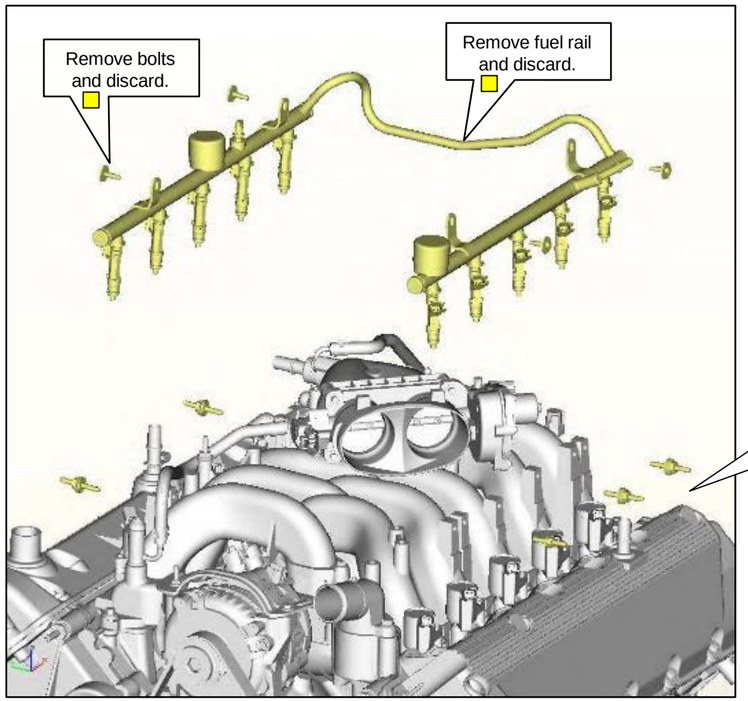
If equipped, remove the gasoline cap, bracket and filler pipe assembly from the vehicle. Remove all associated hardware.



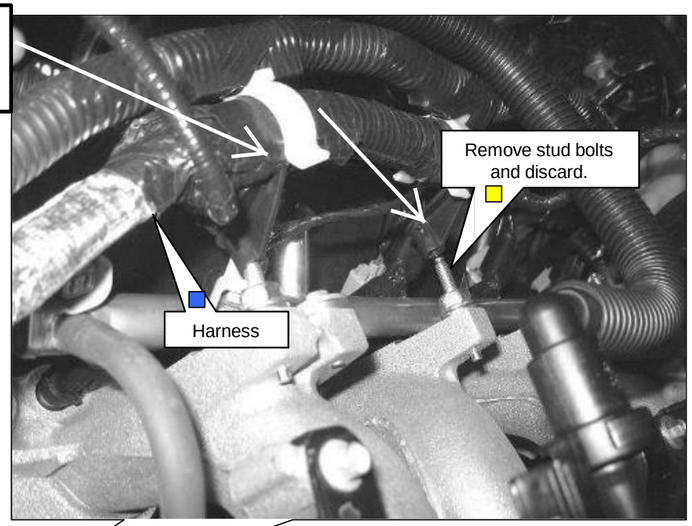
REMOVING ORIGINAL INJECTORS, FUEL RAILS AND STUD BOLTS

1. Disconnect electrical connector from each fuel injector.
2. Remove Engine Harness from mounting studs on intake manifold.
3. Remove Stud clips from Engine Harness and discard.
4. Using a Ford-approved fuel line removal tool, disconnect fuel supply line from the fuel rail. Remove four fuel rail mounting bolts and fuel rail assembly. Discard fuel rail assembly and bolts.
5. Remove studs from intake manifold that were holding engine wiring harness. Discard studs.





Engine harness stud clips.

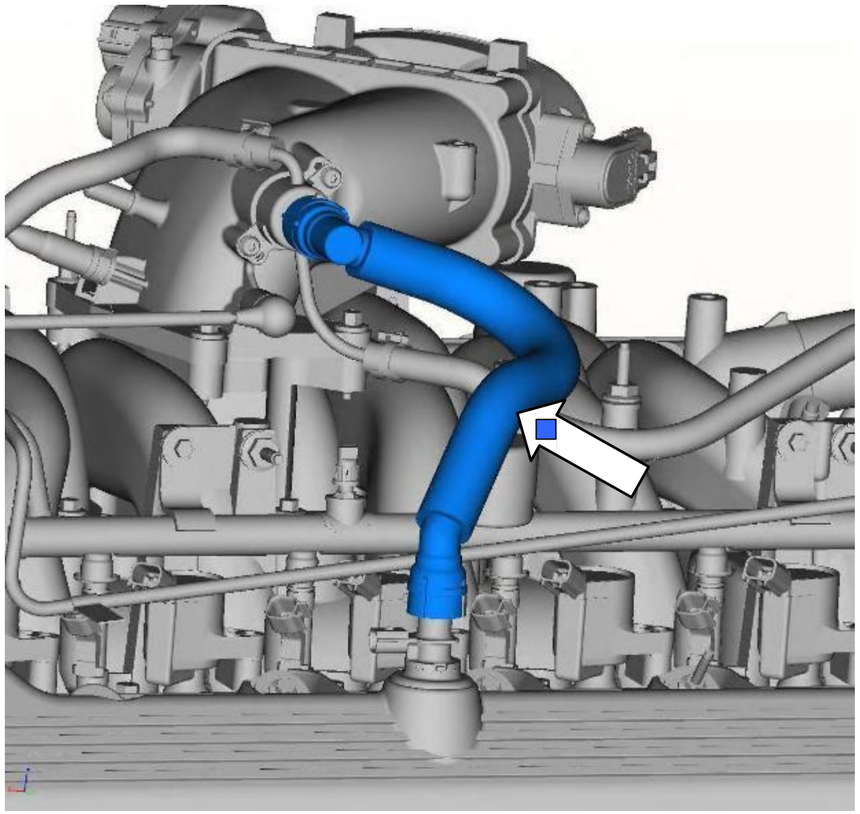


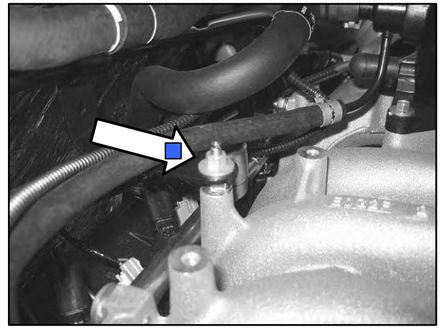
PREPARING ENGINE COMPARTMENT

PREPARING ENGINE COMPARTMENT

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

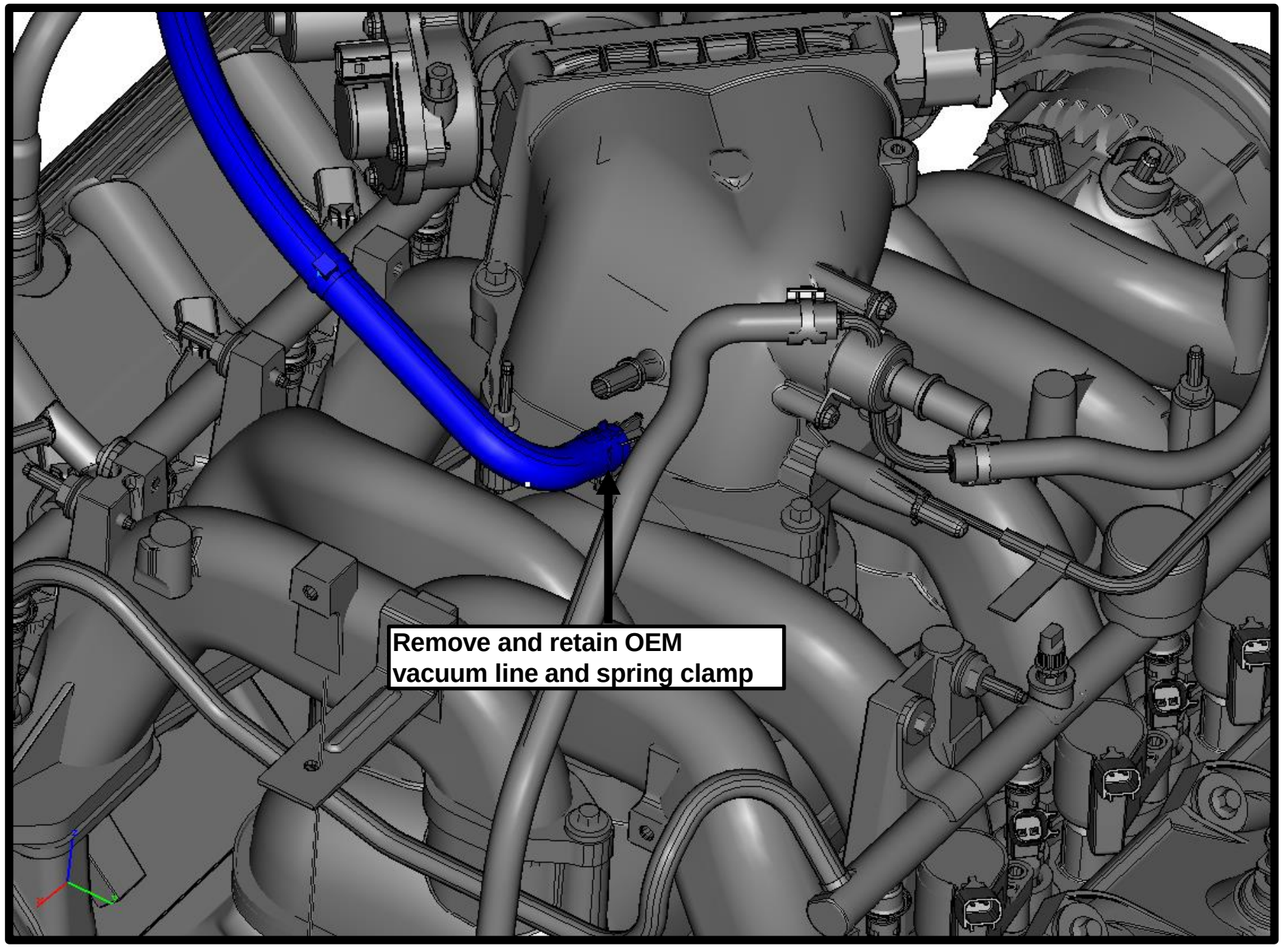
1. Disconnect transmission dipstick tube/heater hose support bracket for clearance.
2. Disconnect and remove positive crankcase ventilation (PCV) hose





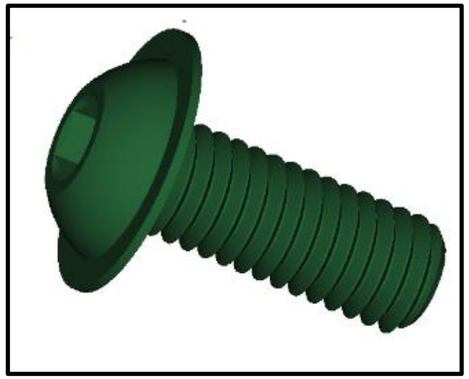
VACUUM BOOSTER LINE MODIFICATION – E-350 SINGLE REAR WHEEL ONLY

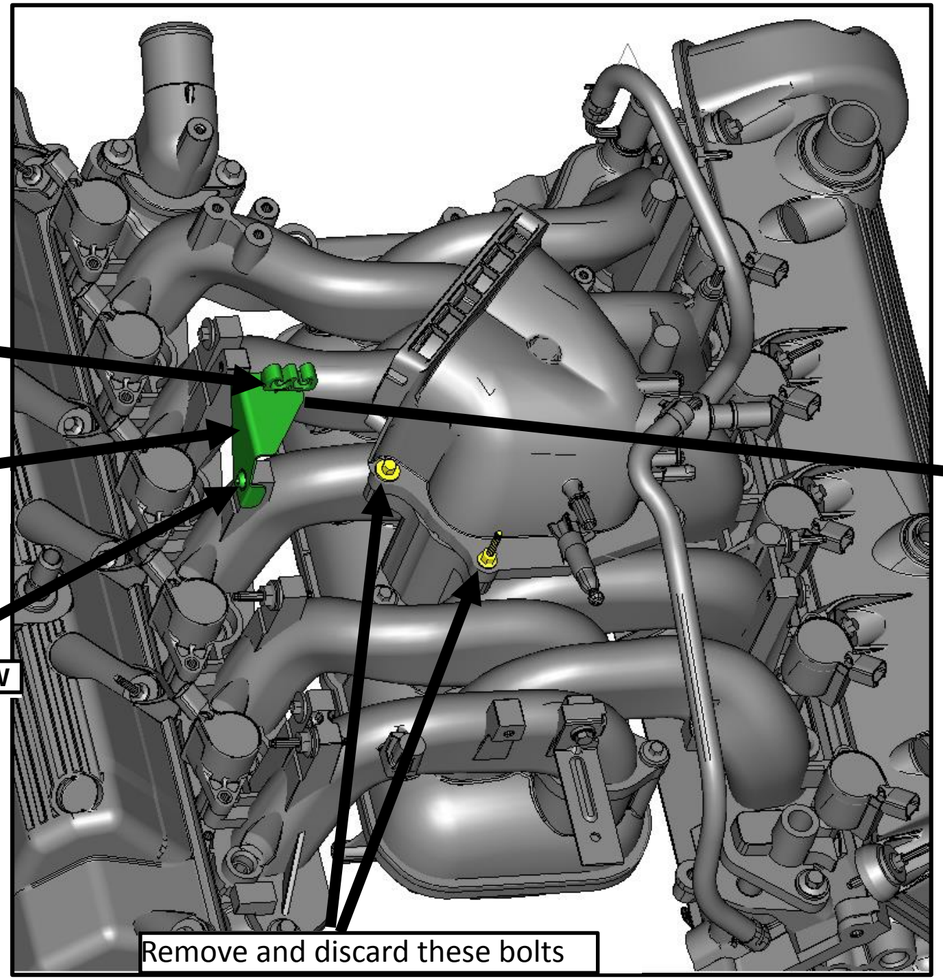
1. **Locate OEM vacuum booster line on back of intake and disconnect line from port. Retain metal spring clamp on line.**

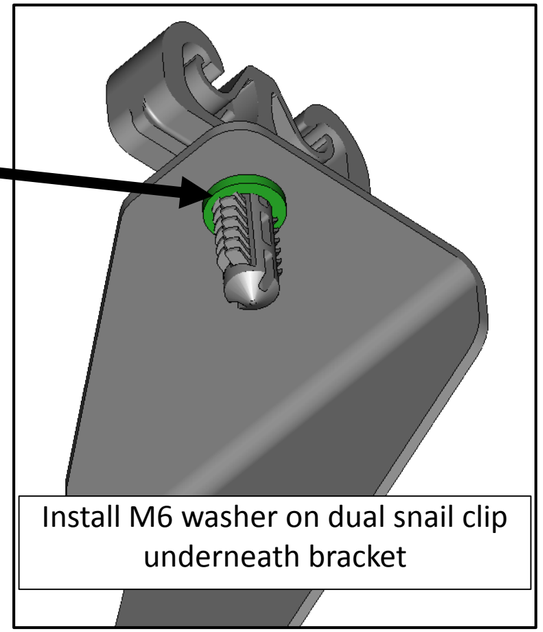


INSTALL RETENTION BRACKET FOR ENGINE RETURN LINE

Inside cab



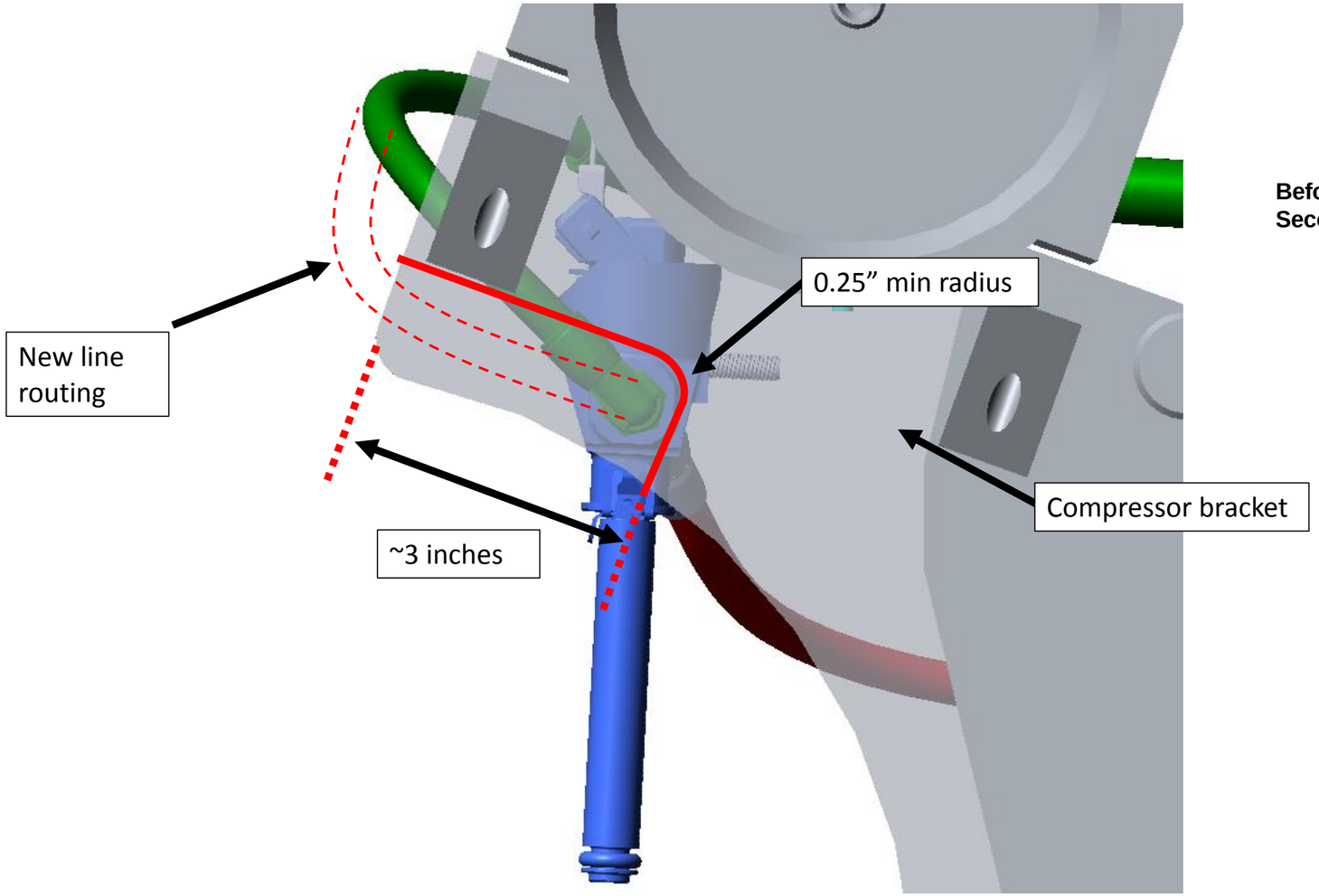




Attach the return line retention bracket (P16JC-10F100-B) using Qty 1 M6 x 16mm button head screw, torque screw to 8-12 Nm; install dual snail clip into hole on top of bracket, and install M6 washer on dual snail clip

Note- Please find all the necessary hardware in P16JC-ENGKIT-A

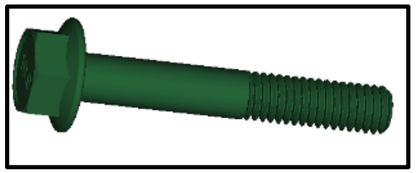
SECONDARY AC BRACKET MODIFICATION FOR TRANS AIR AC SYSTEMS



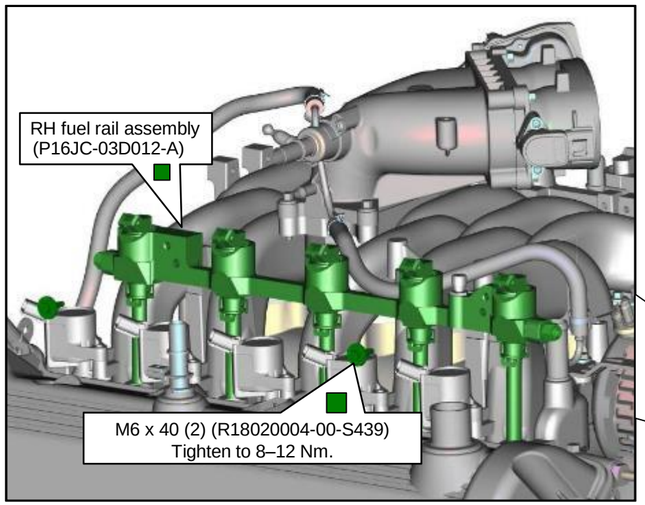
Before installing fuel rails, cut section from Trans Air Secondary AC Bracket as shown

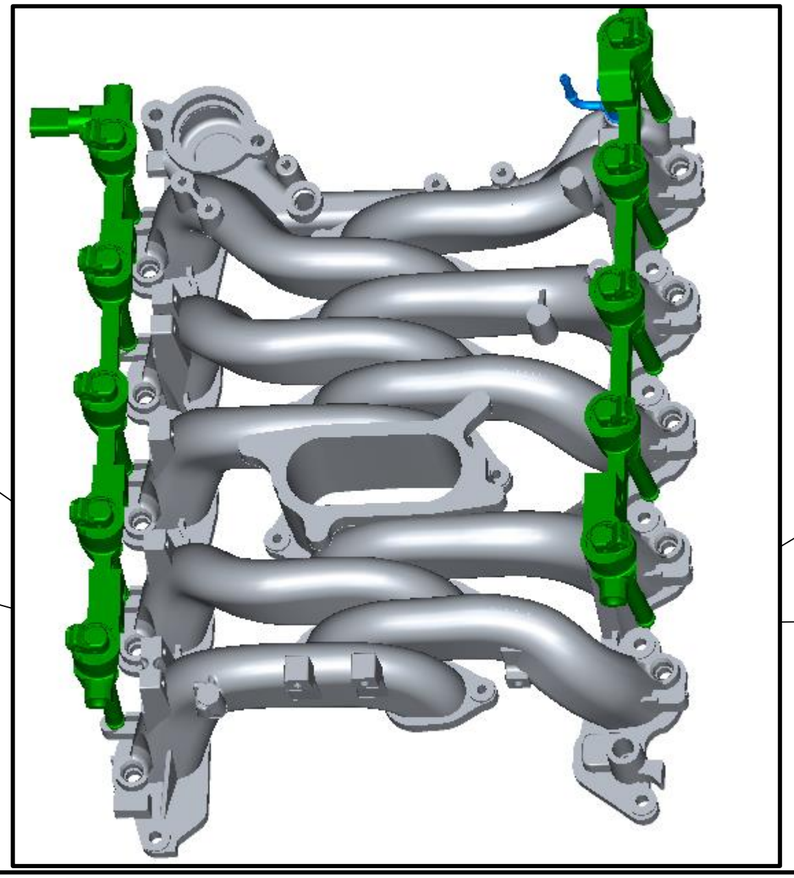
INSTALLING NEW FUEL RAILS

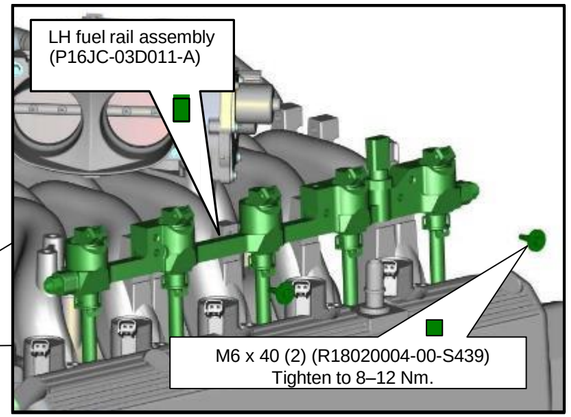
1. **Disconnect coil wires for clearance.**
2. **Using engine oil (Motorcraft SAE 5W-20 or equivalent), lubricate lower O-rings on injector nozzles before seating rail assemblies.**
3. **Position left hand fuel rail assembly onto driver side of intake manifold and fully seat nozzles. Using two M6 x 40 mm bolts (R18020004-00-S439) found in hardware kit P16JC-ENGKIT-A, secure fuel rail to intake manifold. Tighten bolts to 8–12 Nm.**
4. **Position right hand fuel rail assembly onto passenger side of intake manifold and fully seat nozzles. Using two M6 x 40 mm bolts found in hardware kit P16JC-ENGKIT-A, secure fuel rail to intake manifold. Tighten bolts to 8–12 Nm.**



M6 x 40 mm bolt





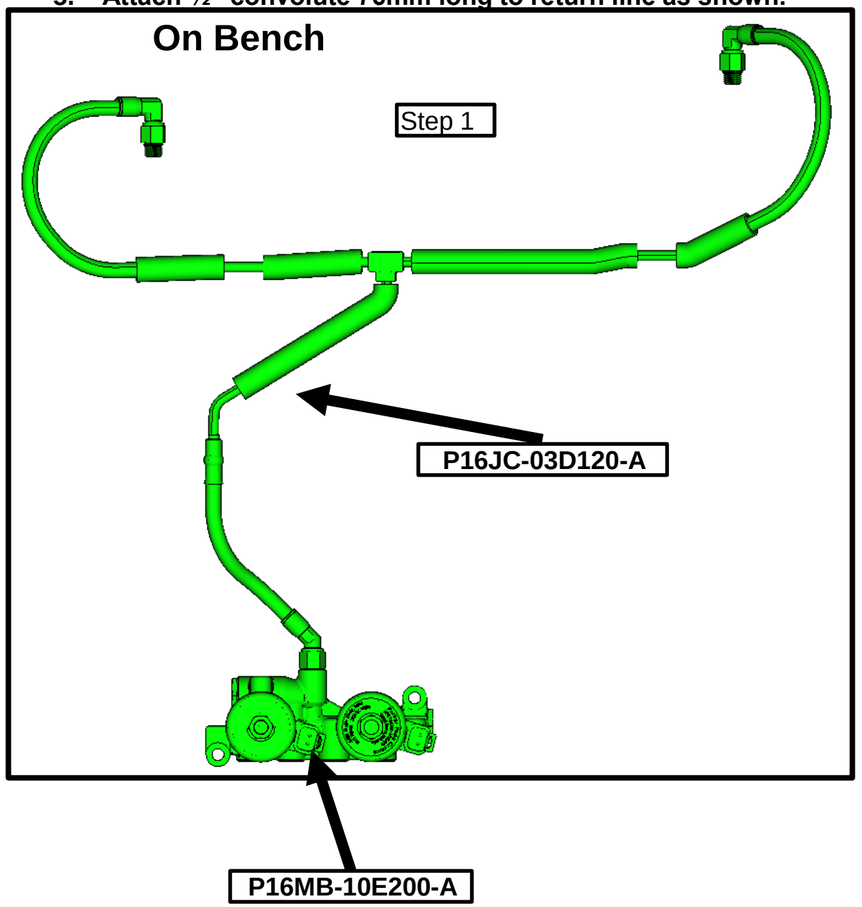


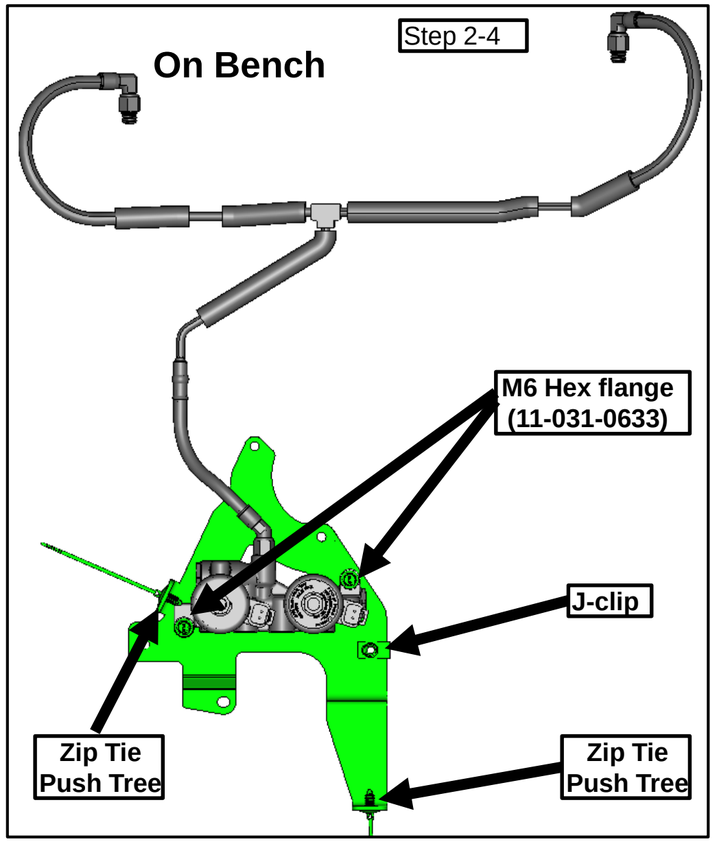
DISCARD REUSE NEW

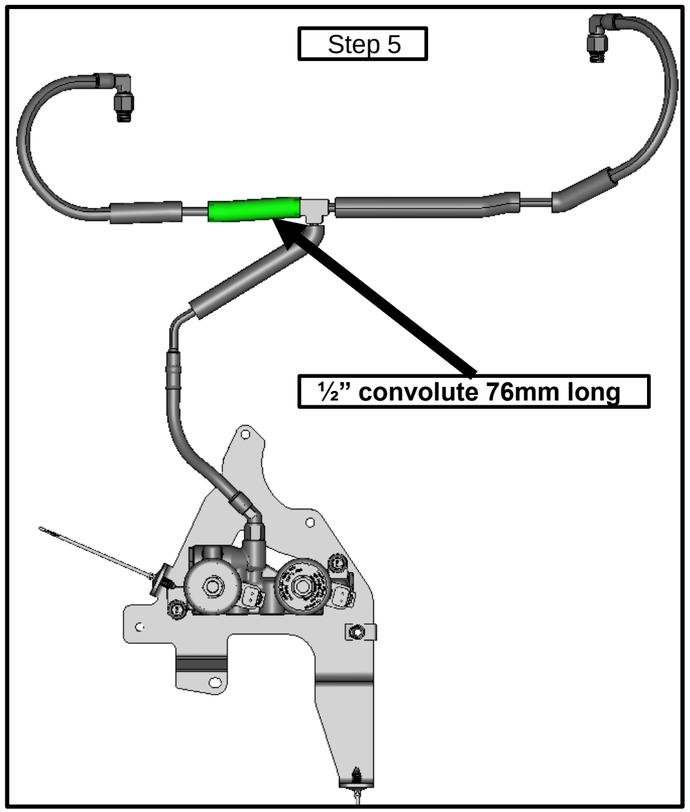
PRE-ASSEMBLE ENGINE RETURN LINE TO FRPCM (FUEL RAIL PRESSURE CONTROL MODULE)

1. Thread the engine return line fitting into the port on the back of the FRPCM; torque fitting to 20-22 Nm.
2. Using Qty 2 M6 x 40mm stainless hex flange (11-031-0633) and Qty 2 M6 hex flange nuts (11-278-0274), attach the FRPCM (P16MB-10E200-A) to the FRPCM bracket (P16JC-10E201-A); torque bolts to 8-12 Nm
3. Attach Qty 1 j-clip (W520822-S439) as shown
4. Connect Qty 2 Zip Tie Push Tree (155-05800) in two positions as shown.
5. Attach ½" convolute 76mm long to return line as shown.

M6 x 40mm

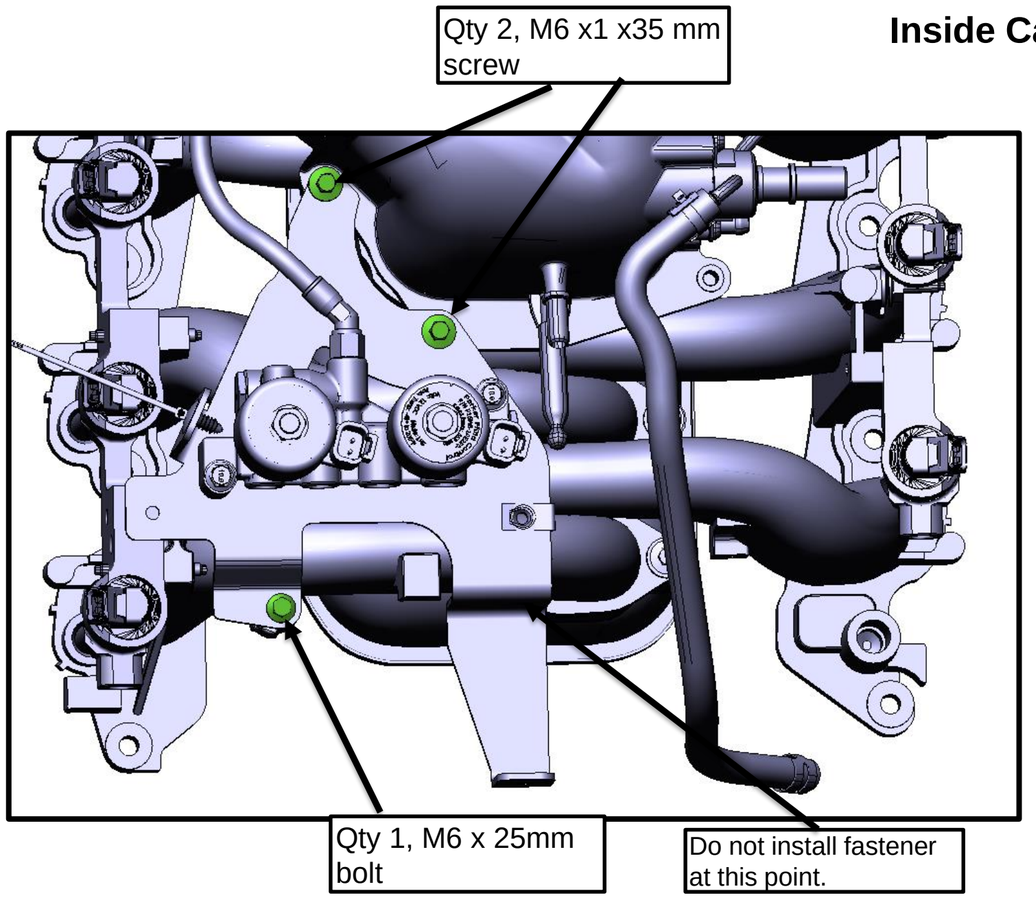




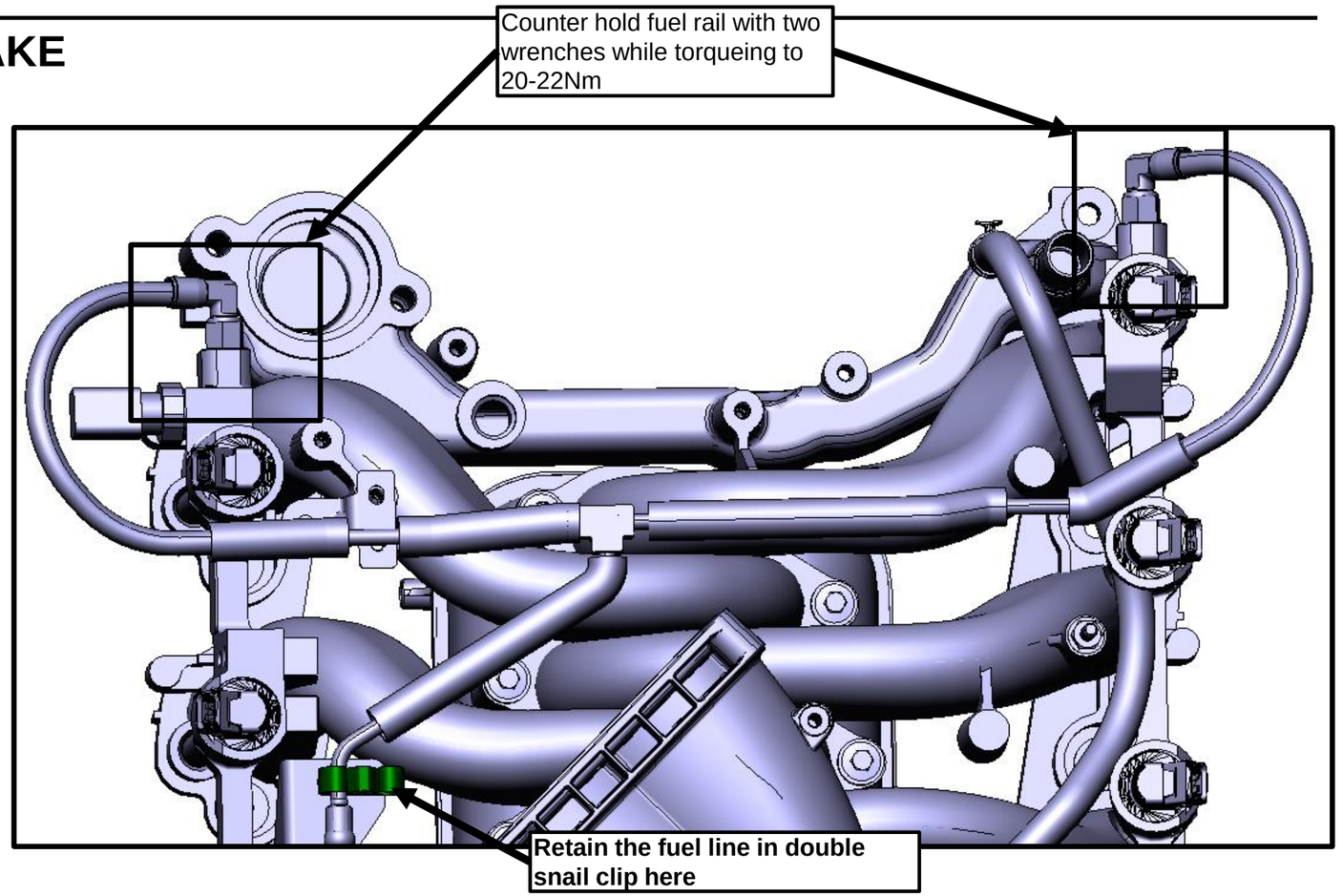


Note- Please find all the necessary hardware in P16JC-ENGKIT-AA and P16JC-FUEL1-AA

INSTALL FRPCM BRACKET ASSEMBLY TO INTAKE



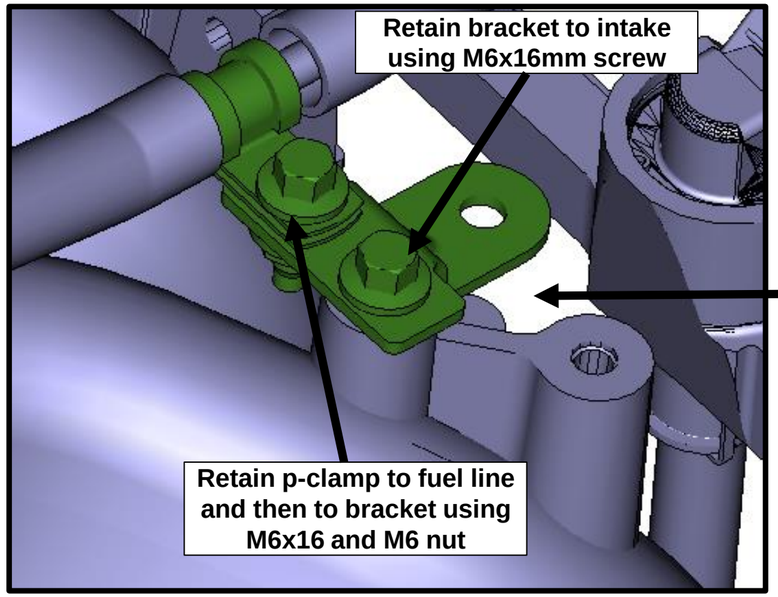
Inside Cab

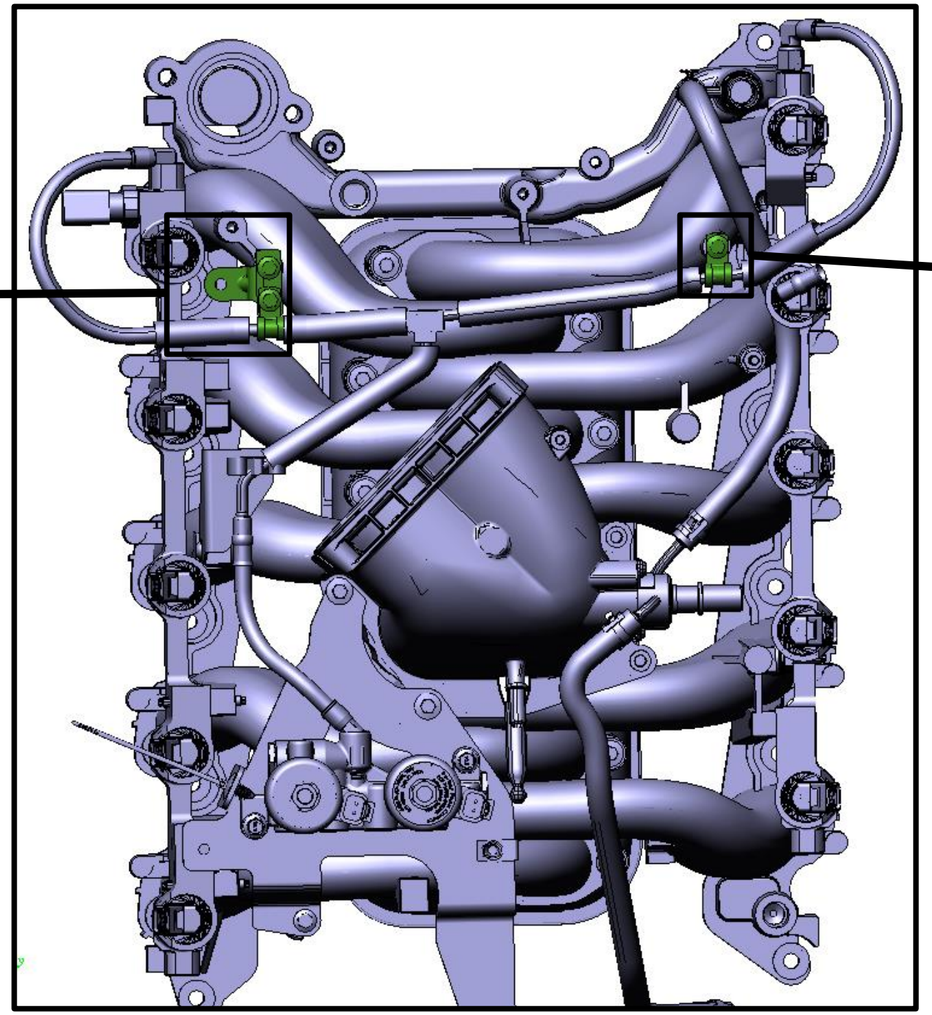


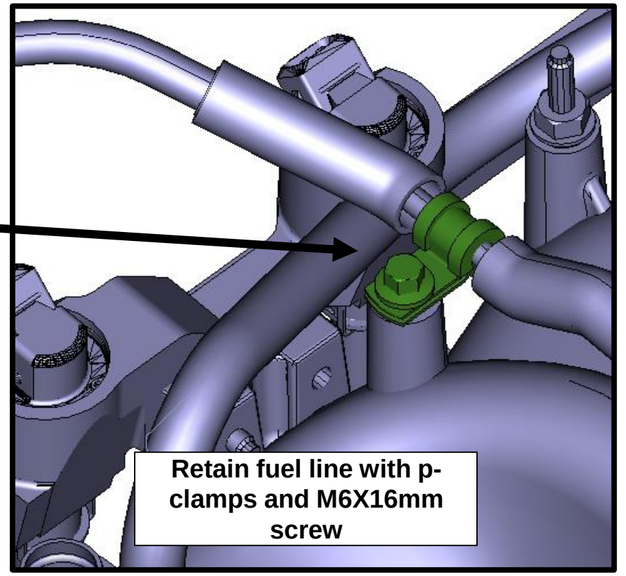
1. Using Qty 2 M6 x 31mm bolts (N808429-S437), secure the FRPCM bracket to the throttle body spacer; torque bolts to 8-12 Nm
2. Using Qty 1 M6 x 25mm bolt (W500215-S439), secure the FRPCM bracket to the intake manifold as shown; torque bolt to 8-12Nm; leave the 4th mounting hole empty until the VMV bracket is installed.
3. Position the engine return line (P16JC-03D120-AA) on top of the intake manifold
4. Attach fuel line fittings to end of fuel rails; torque to 20-22 Nm
5. Use Qty 2 p-clips (11-054-0158) and Qty 2 M6 x 16mm screws (11-357-0322) to secure the line in place on the intake manifold; hand tighten screws.
6. Torque p-clips screws to 8-12 Nm

Note-1. Find all the necessary hardware in P16JC-ENGKIT-A
2. Move/adjust the OEM harness out of the way before installing fuel lines.

INSTALL FUEL LINE IN P-CLAMPS



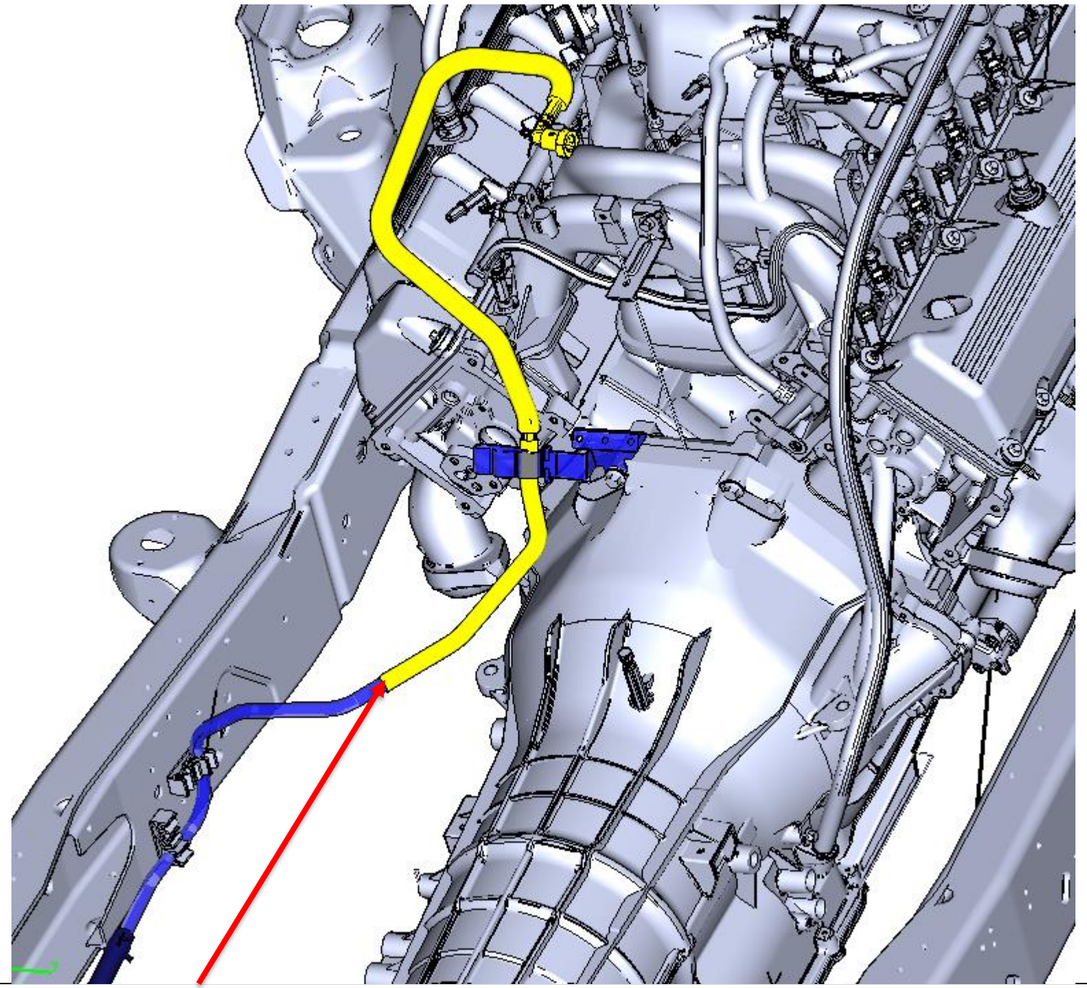




1. On driver side, secure bracket (P11BB-9F897-A) to intake using M6x16mm screw. Hand tighten
2. Secure p-clamp (11-054-0158) to fuel line and then to bracket using M6x16 screw and M6 nut (11-278-0274). Ensure bracket is aligned as shown. Torque screws to 8-12 Nm

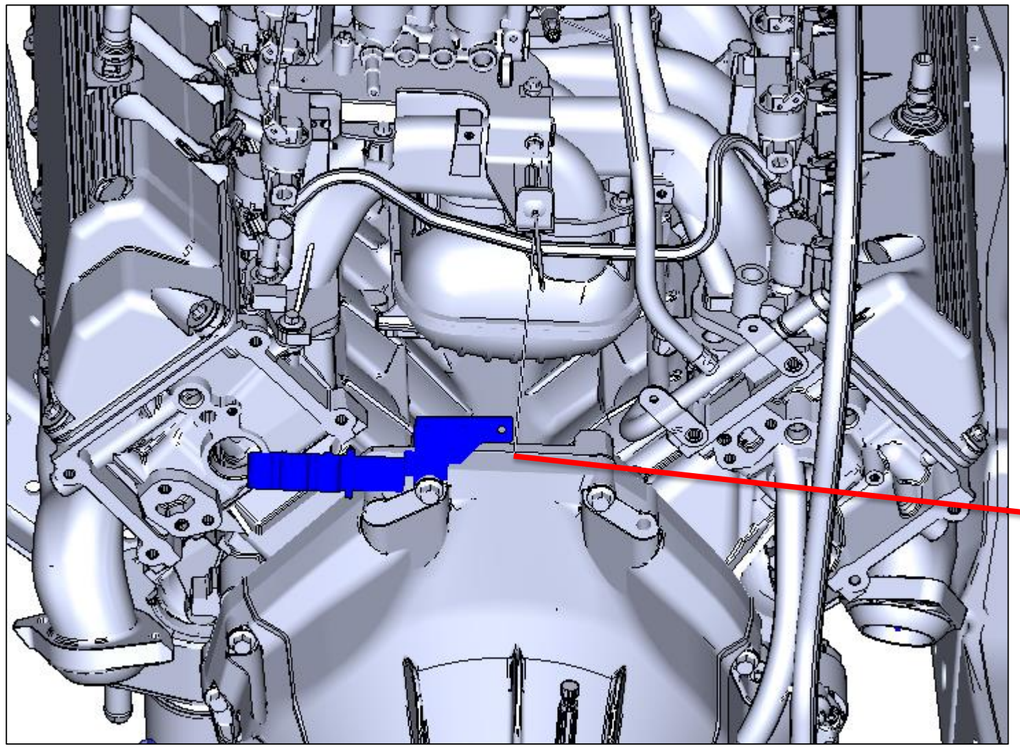
3. On passenger side, retain fuel line to intake using p-clamp (11-278-0274) and M6x16mm screw. Torque to 8-12 Nm.

MODIFYING THE OEM VAPOR LINE



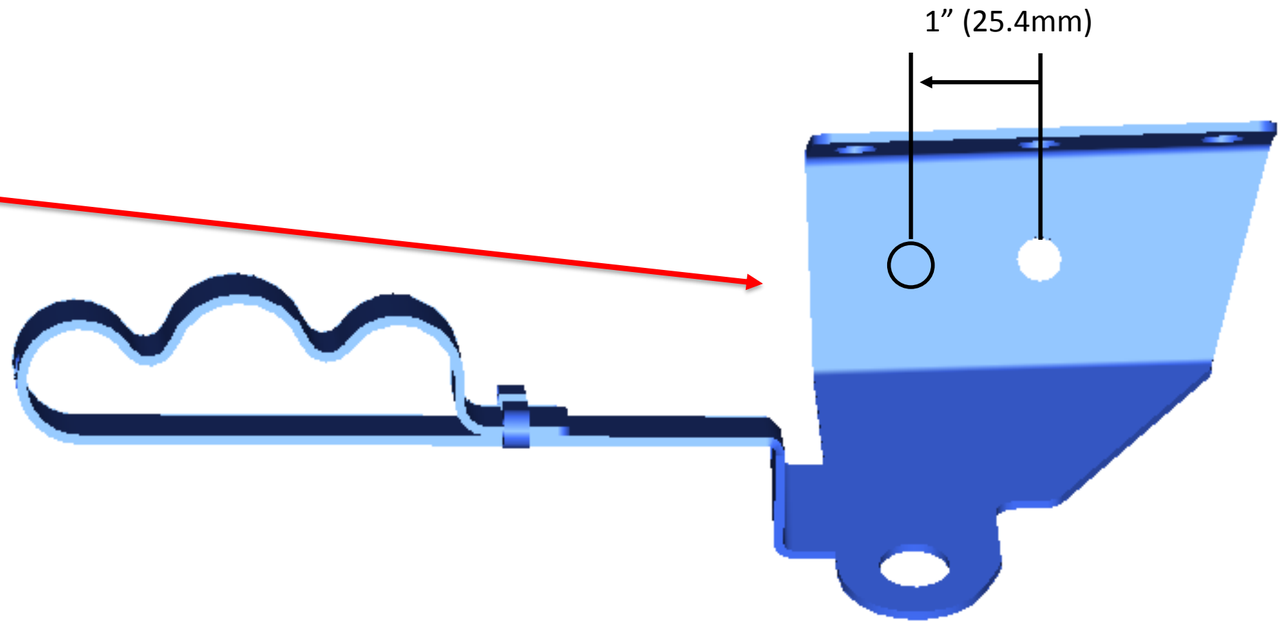
Remove the top half of the OEM vapor line by cutting the nylon portion of the line that is formed onto the steel barb end of the line. The length removed routes from the top of the engine and then down alongside the transmission bell housing and then terminates before it meets the LH frame rail into the steel portion of the vapor line. Discard the top half of the line ONLY.

MODIFY THE OEM TRANSMISSION MOUNTED FUEL LINE RETENTION BRACKET



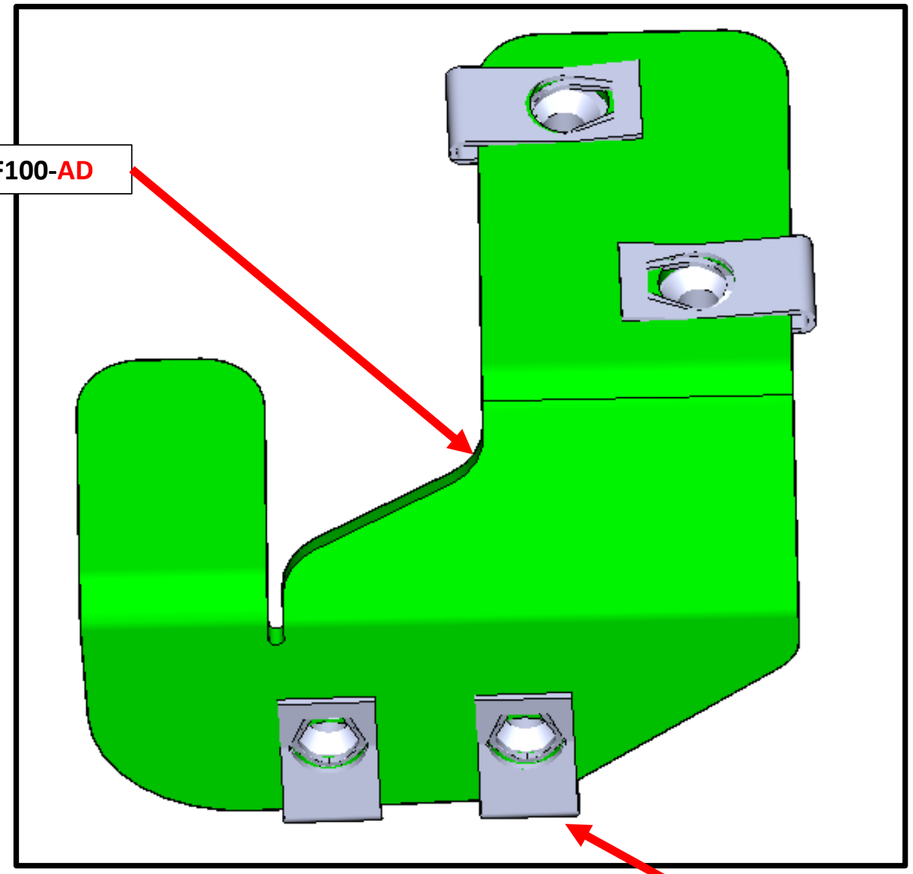
Modify the OEM transmission fuel line retention bracket by drilling a hole into the bracket. Remove the OEM bracket to modify it.

Drill a ¼" hole into the OEM transmission mounted fuel line retention bracket. After drilling the hole, use undercoat spray to cover the bare metal on the hole.



ENGINE SUPPLY LINE RETENTION BRACKET INSTALLATION

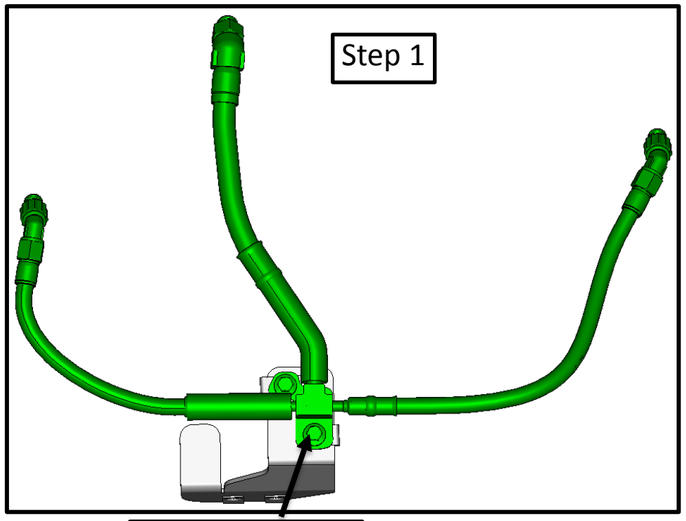
Attach Qty. 4 j-clips (W520822-S439) to (P16JC-10F100-AD) Supply Line Retention Bracket as shown.



Note- Find all the necessary hardware in P16JC-ENGKIT-AA

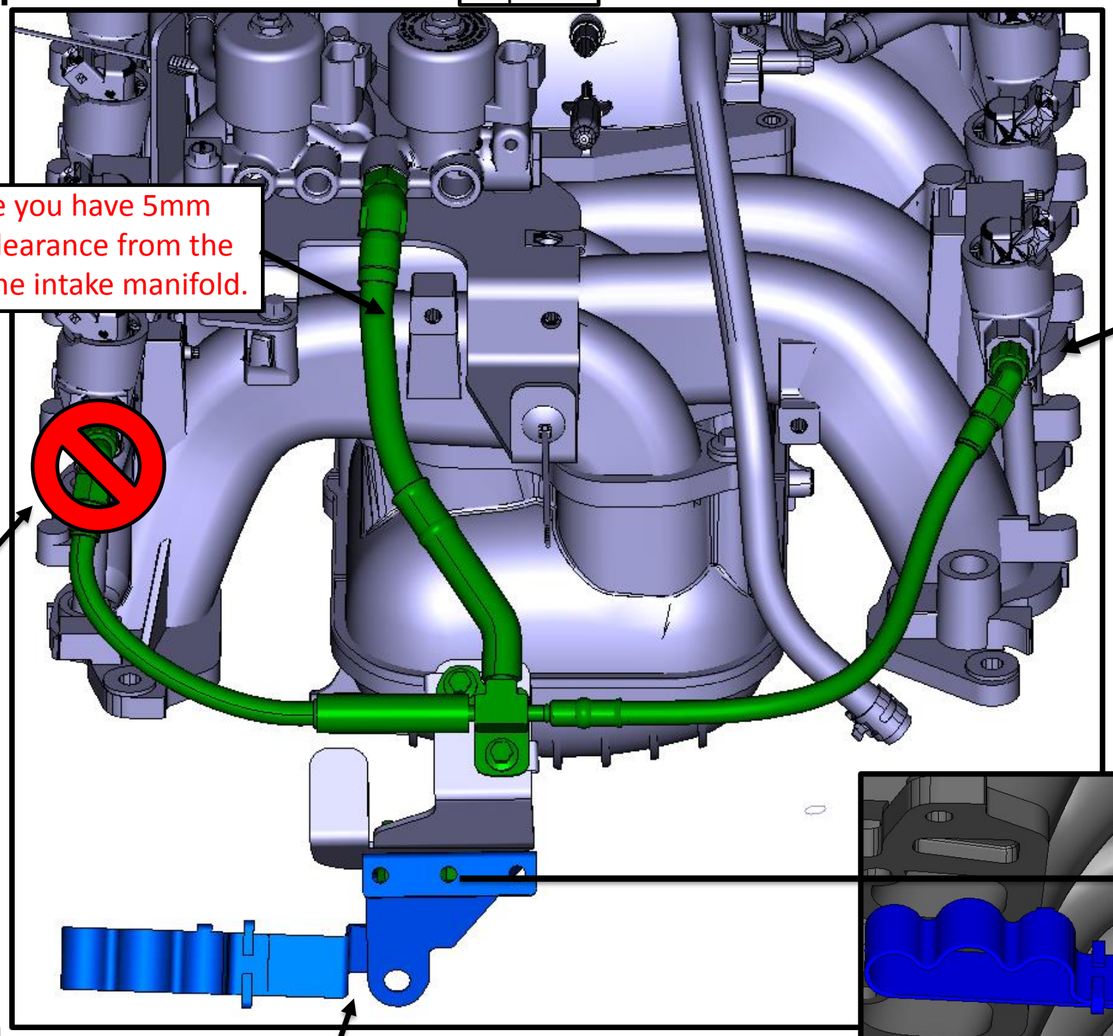
INSTALL ENGINE SUPPLY LINE TO FRPCM

Step 1



Use qty 2 M6x16 bolts to attach fuel line to bracket. Torque to 8-12 Nm

Step 2 &3



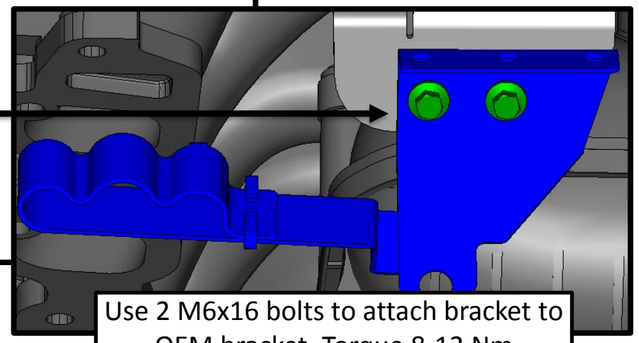
Make sure you have 5mm minimum clearance from the fuel line to the intake manifold.

Torque supply line to 23-26 Nm

Do not torque LH rail connection yet

Ford Transmission brkt

Step 4

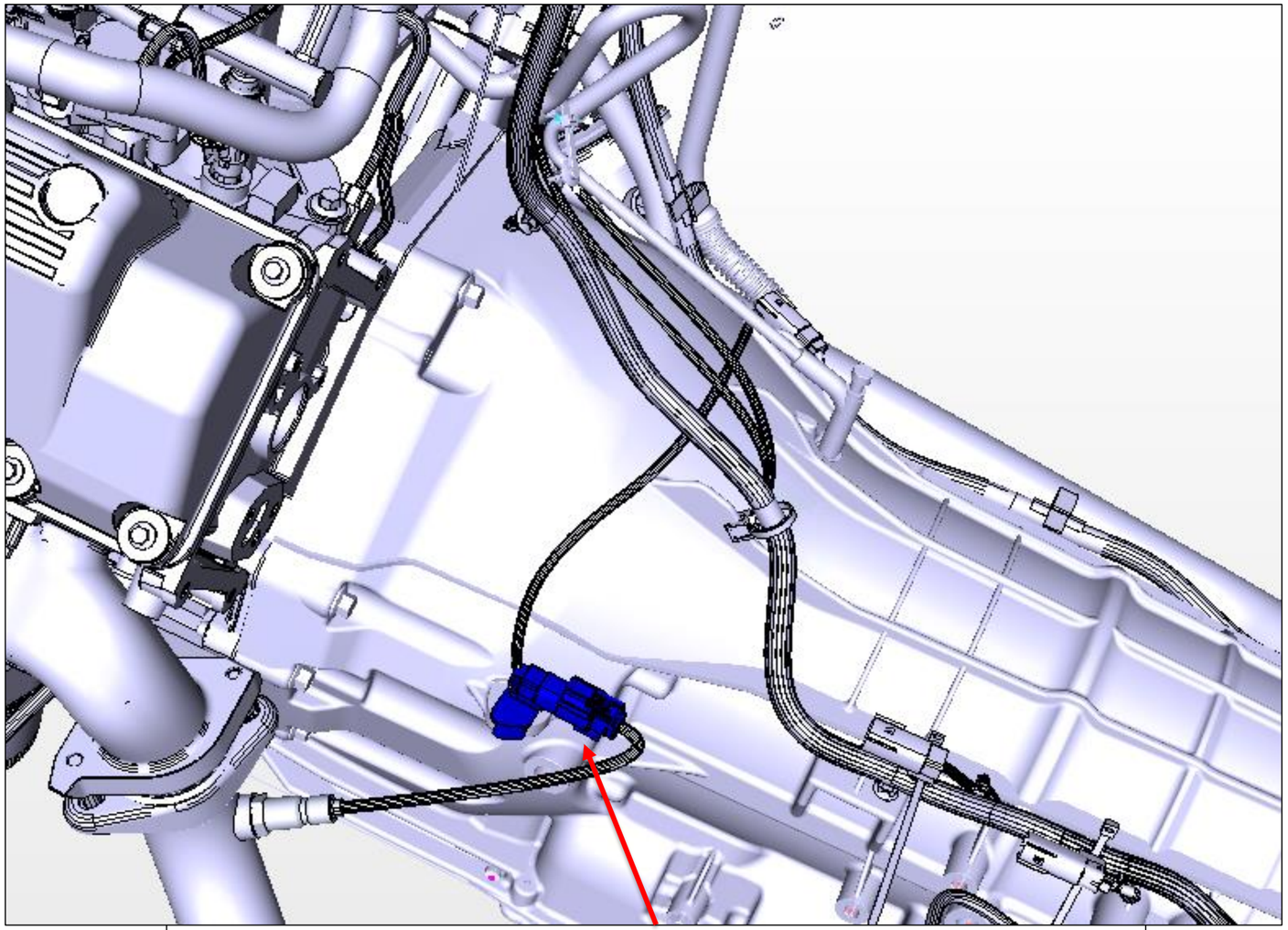


Use 2 M6x16 bolts to attach bracket to OEM bracket. Torque 8-12 Nm

1. **Attach brazed “t” bracket on Engine Supply Line (P16JC-03D110-AA) to the retention bracket (P16JC-10F100-A) using Qty 2 M6 x 16mm bolts (W500213-S437); torque bolts 8 to 12 Nm.**
2. **Route -05 fitting on engine supply line to the FRPCM; torque to 23-26 Nm.**
3. **. Attach one fitting on the engine supply line P16JC-03D110-A to the RH fuel rail; torque fittings to 20-22 Nm, *counter hold fuel rail with two wrench while torqueing.* *Make sure the supply line is underneath engine wiring harness and LH fuel rail is not connected.***
4. **Using Qty 2 M6 x 16mm bolt (W500213-S437) attach the supply line retention bracket (P16JC-10F100-A) to the OEM fuel line retention bracket mounted to the transmission; torque bolt to 8- 12 Nm**

Note- Find all the necessary hardware in P16JC-ENGKIT-AA.

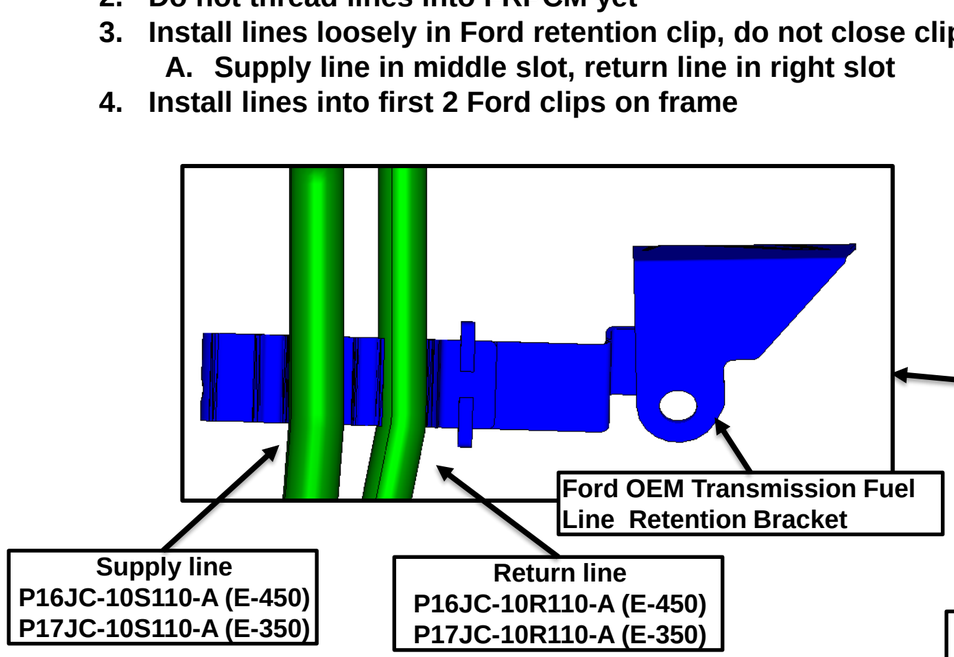
EXHAUST O2 SENSOR CONNECTOR

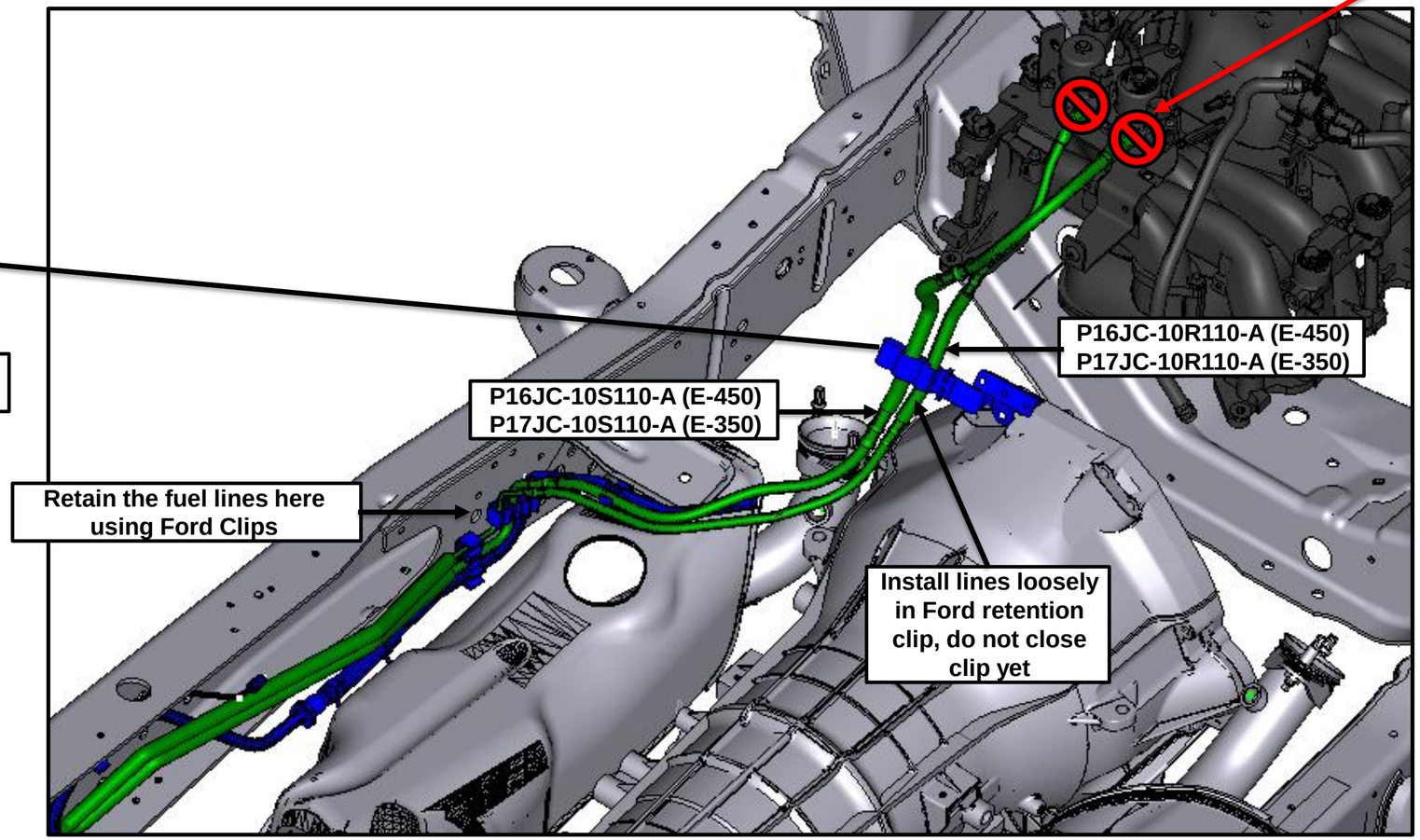


Due to the routing of the forward lines and vapor lines the location of this connector needs to be removed to have adequate clearance to the fuel lines. It will be reinstalled later

INSTALL FORWARD SUPPLY AND RETURN FUEL LINES

1. Install forward supply line (P16JC10S110-A/P17JC-10S110-A) and forward return line (P16JC-10R110-A/P17JC-10R110-A) into vehicle by routing lines from under vehicle and over exhaust heat shield
2. Do not thread lines into FRPCM yet
3. Install lines loosely in Ford retention clip, do not close clip yet
   A. Supply line in middle slot, return line in right slot
4. Install lines into first 2 Ford clips on frame

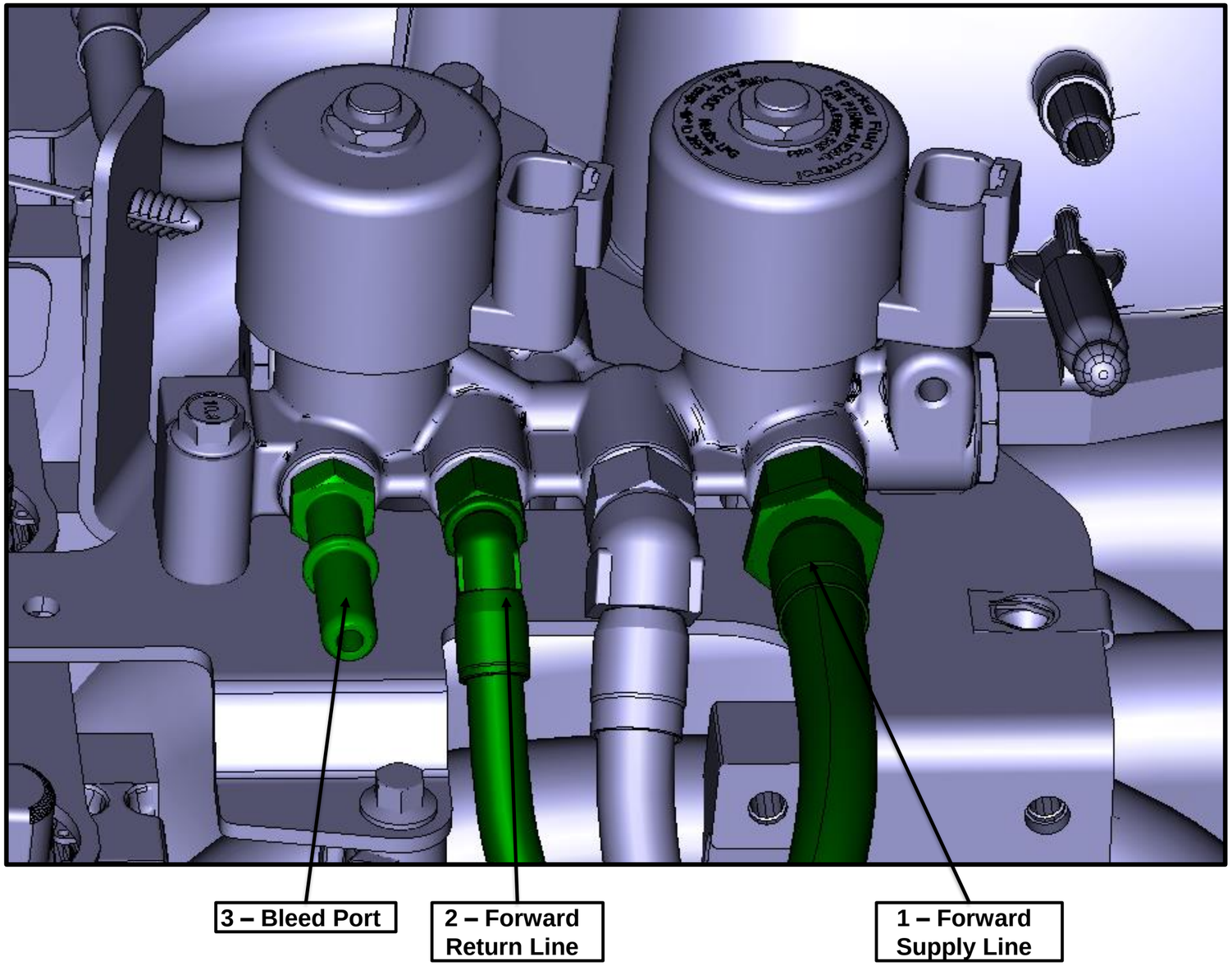




TORQUE FRPCM FITTINGS

Note: Torque fittings in order as shown to maintain tool access

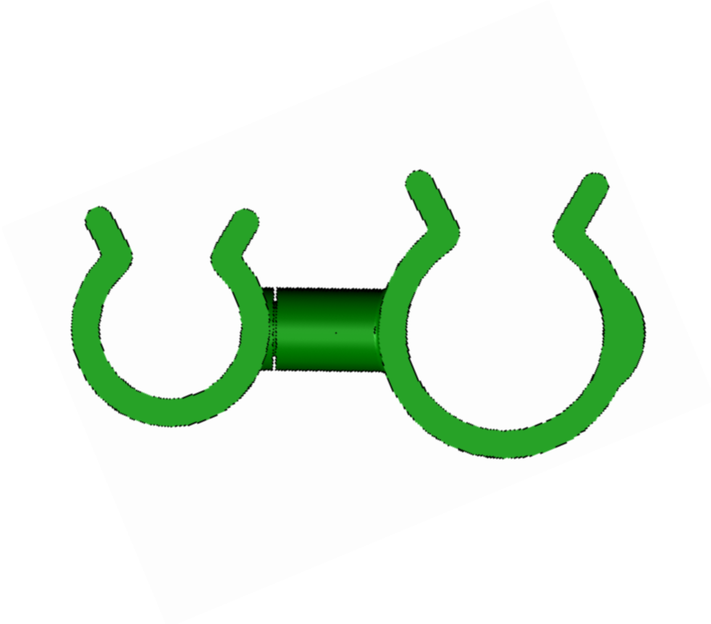
1. **Torque forward supply line to 29-33 Nm**
2. **Torque forward return line to 18-20 Nm**
3. **Thread bleed port P16MB-10E215-A to FRPCM and torque to 18-20 Nm**

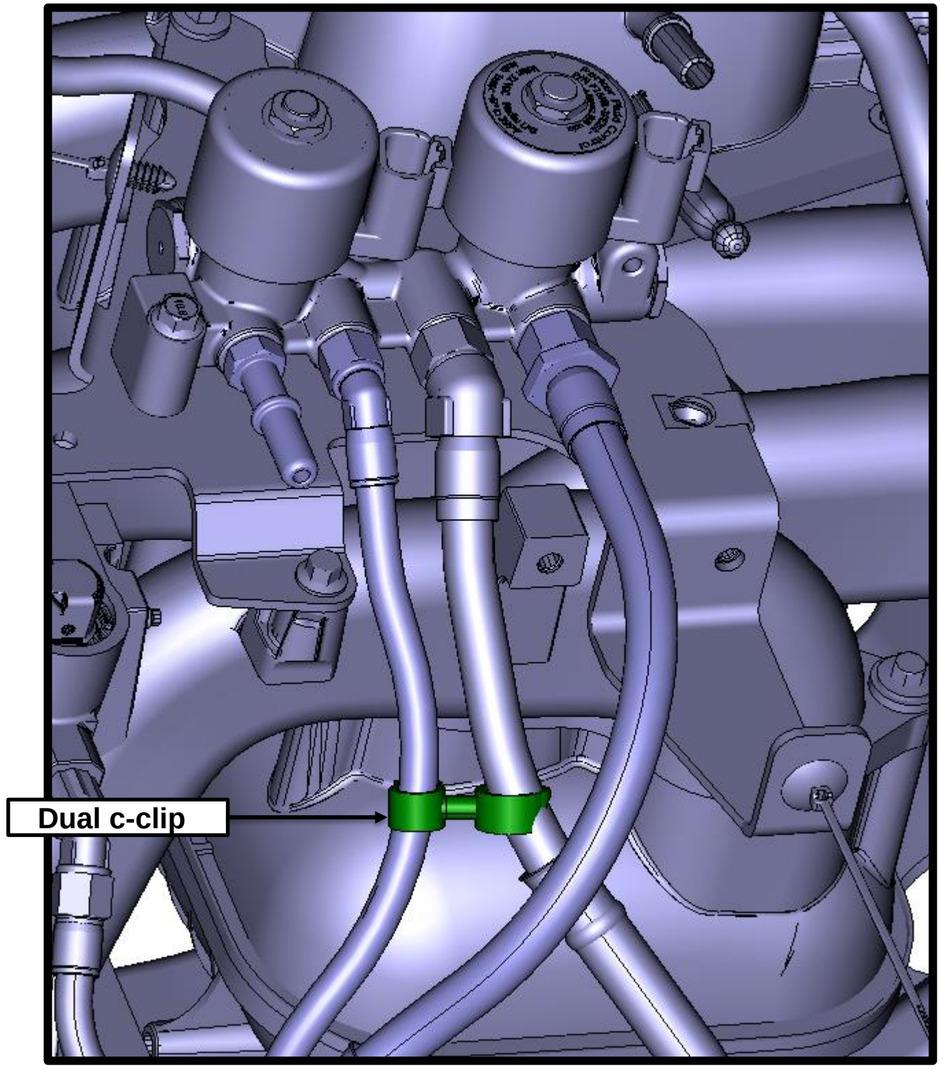


INSTALL DUAL C-CLIP TO FUEL LINES

1. **Install dual c-clip (W713776-S300) to engine supply line and forward return line as shown.**

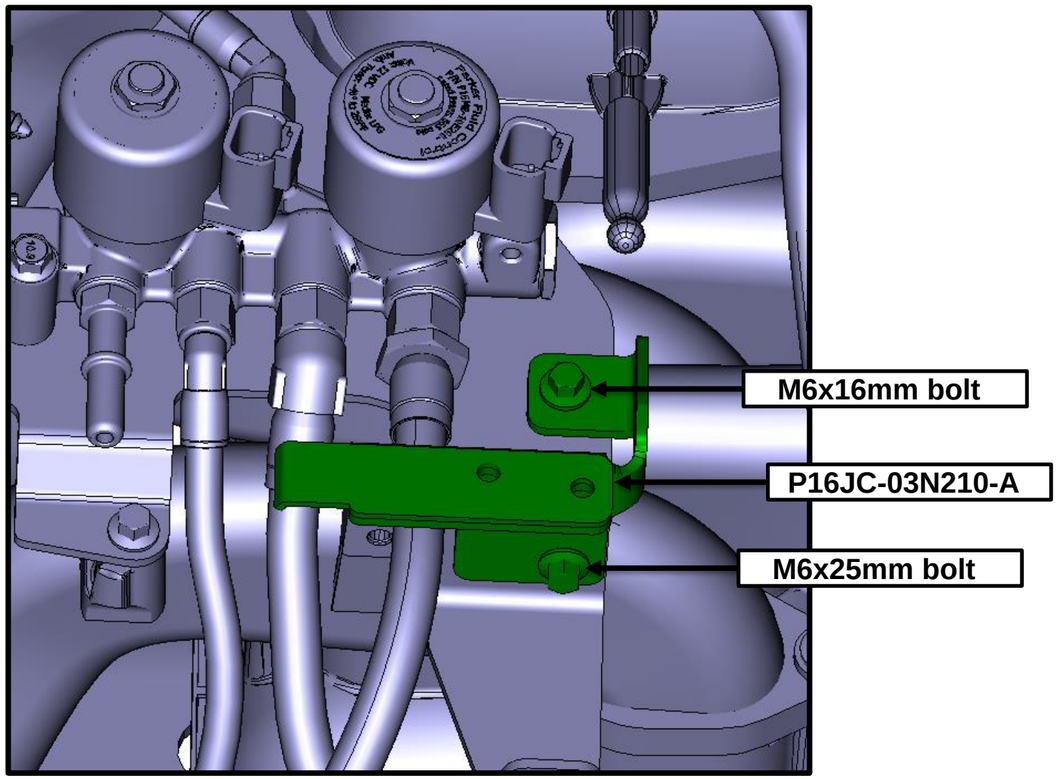
Ensure lines have minimum 5mm clearance after clip is installed

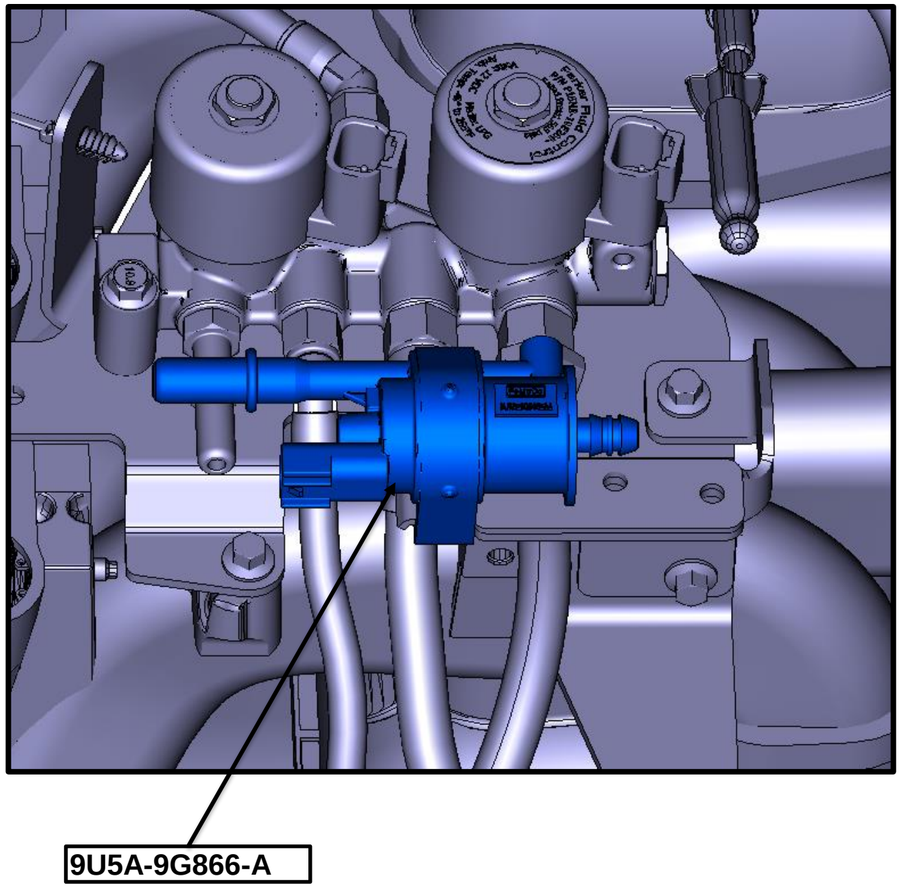




INSTALL VMV BRACKET AND VMV

Inside Cab



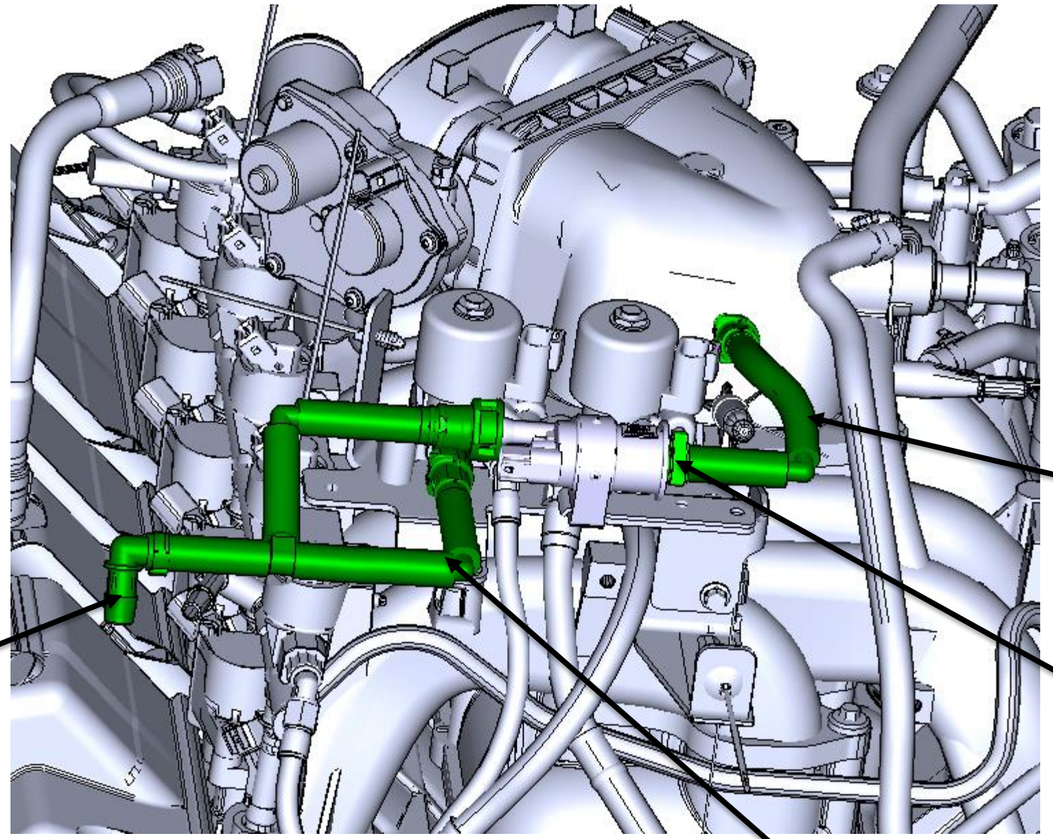


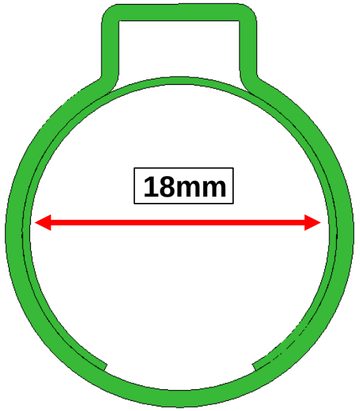
1. **Attach VMV bracket (P16JC-03N210-A) to the FRPCM bracket using one M6x16mm bolt (W500213-S437) on top surface, and one M6x25mm bolt (W500215-S439) on side surface. Torque bolts to 8-12 Nm.**
2. **Slide OEM VMV (9U5A-9G866-A) onto the VMV bracket as shown**

Note- Find all the necessary hardware in P16JC-ENGKIT-AA

INSTALL ENGINE AND FRPCM PURGE HOSE

Inside Cab

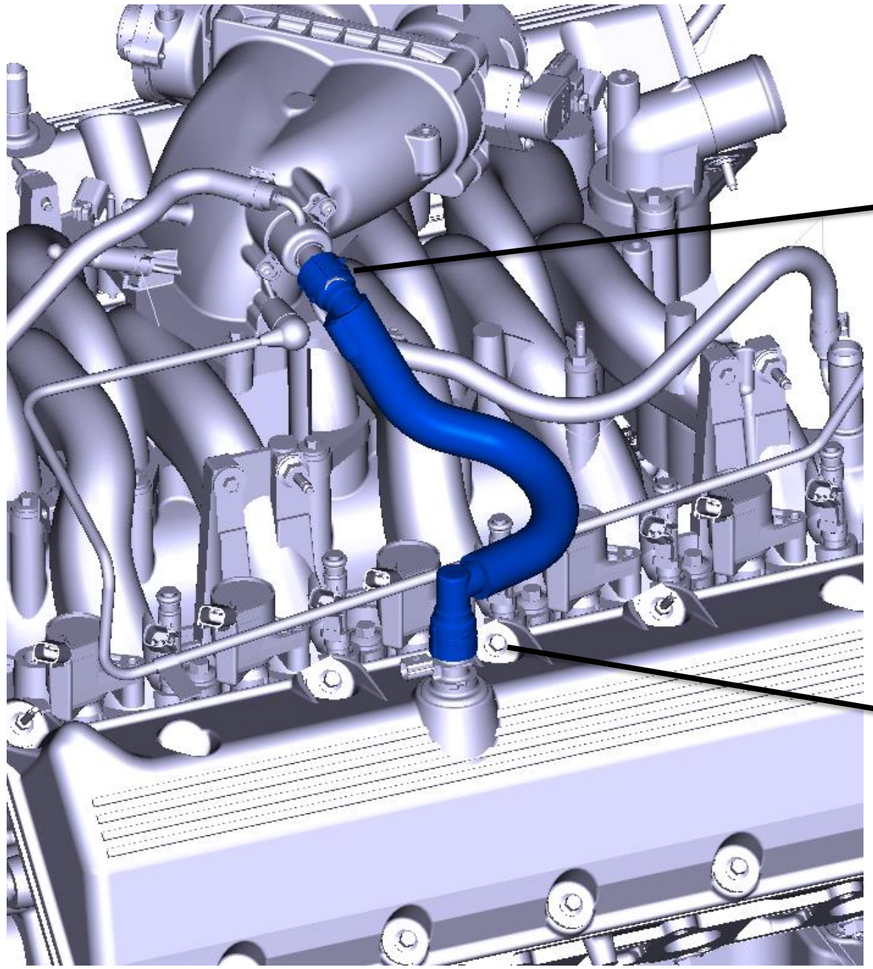


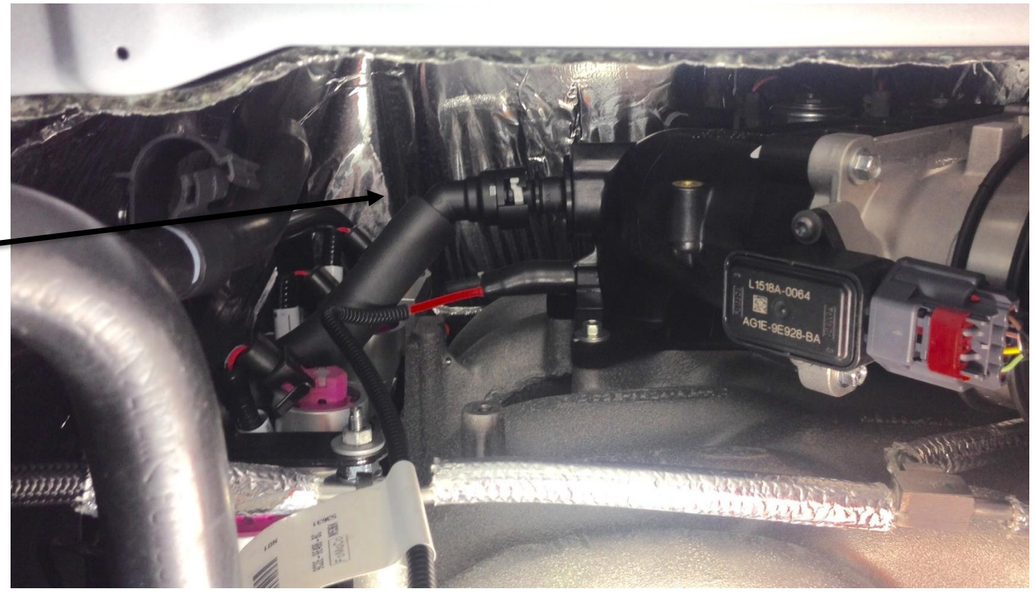


1. Connect one end of P16JC-03N110-A, engine purge hose to VMV using 16.5-19mm clamp (16700019) and the other end to engine throttle body as shown.
2. Install the FRPCM Purge hose assembly P16JC-03N100-A onto the FRPCM Bleed port using the quick connect
3. Connect other end of purge hose to VMV quick connect Port as shown.
4. Leave the 90 degree elbow end loose. This will install into the new vapor line.

Note- Find all the necessary hardware in P16JC-ENGKIT-A.

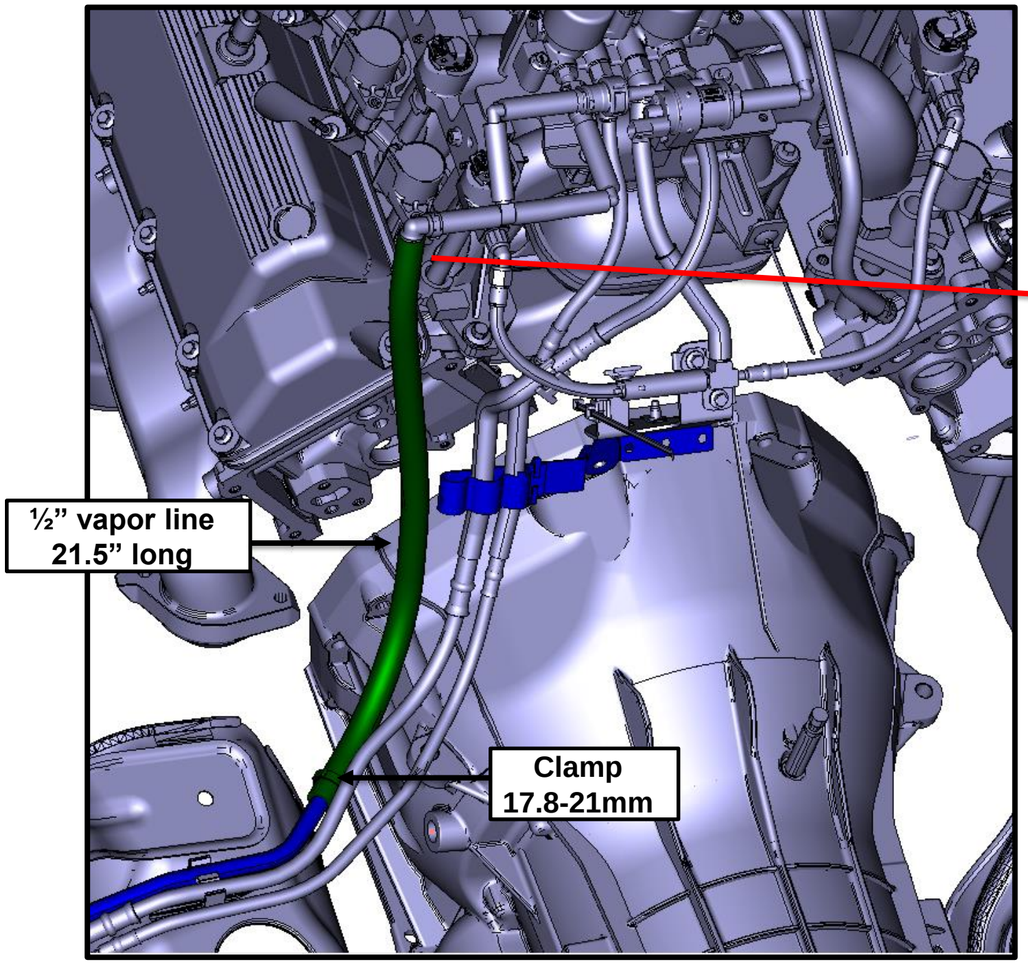
REINSTALL PCV HOSE TO ENGINE



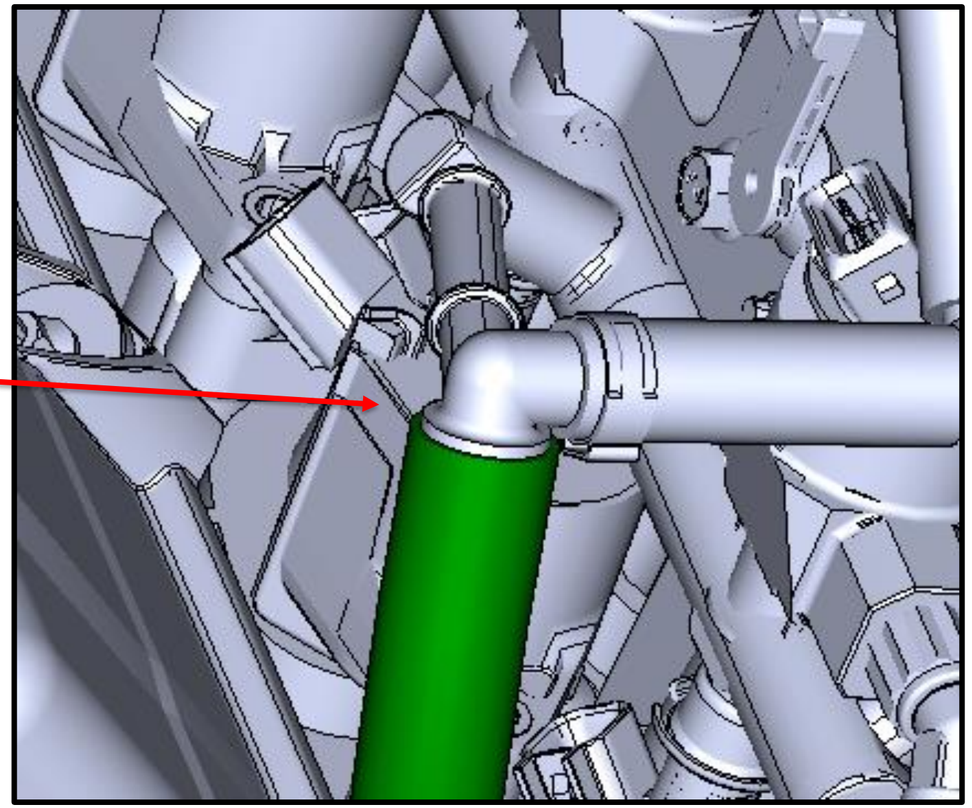


1. **Flip hose upside down and re-clock fittings. 45° fitting connects to intake. 90° fitting connects to valve cover**

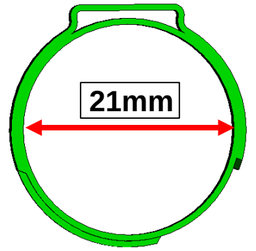
INSTALLING NEW VAPOR LINE



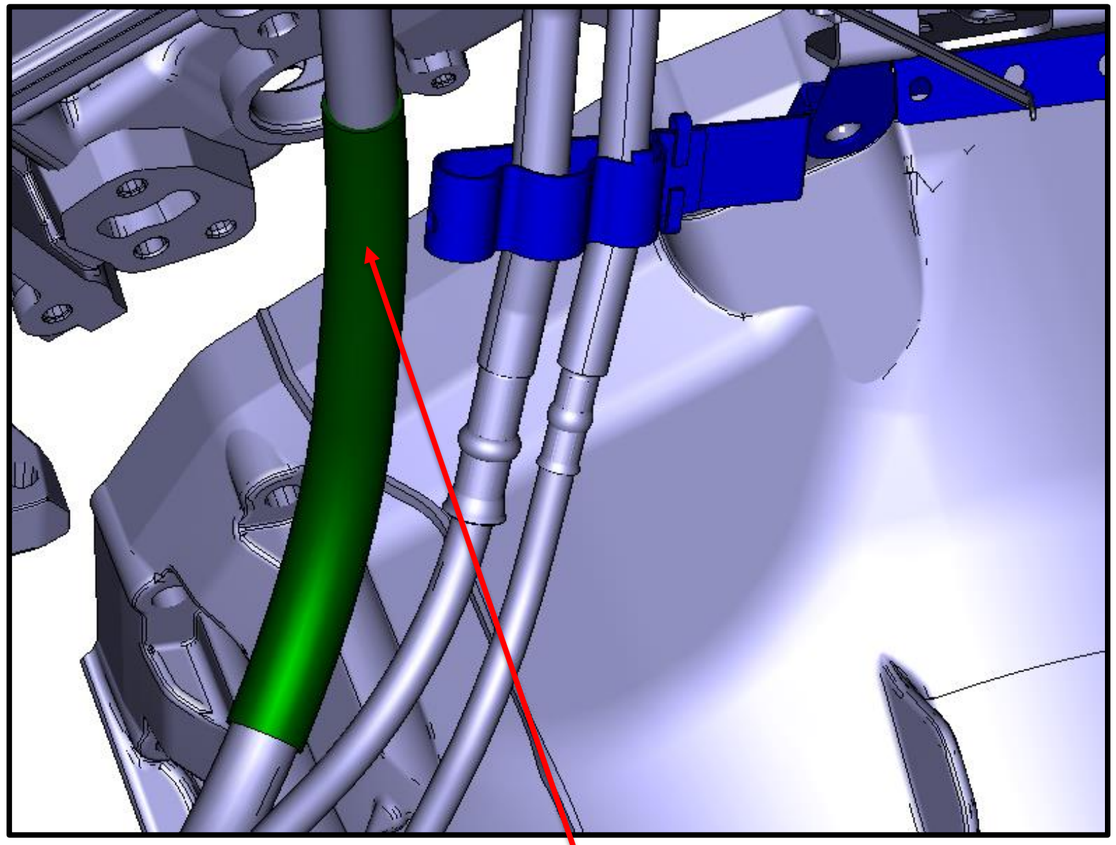
Install a ½” vapor line 21.5” long (A-CB93120-500-547) onto the OEM steel vapor line barb using a 17.8-21mm clamp (16700024).



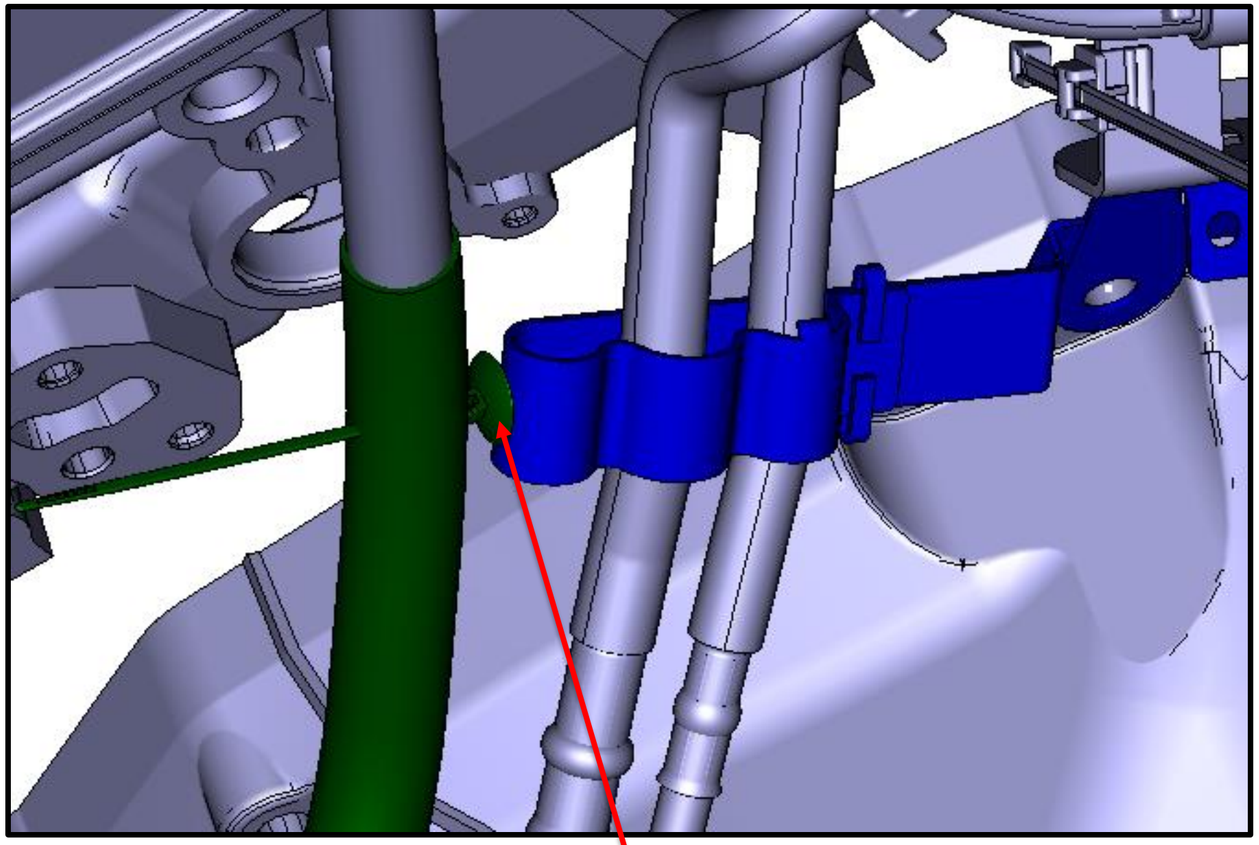
Connect the open end of the vapor line to the elbow on the purge hose assembly (P16JC-03N100-A) by sliding it onto the barb.



INSTALLING NEW VAPOR LINE

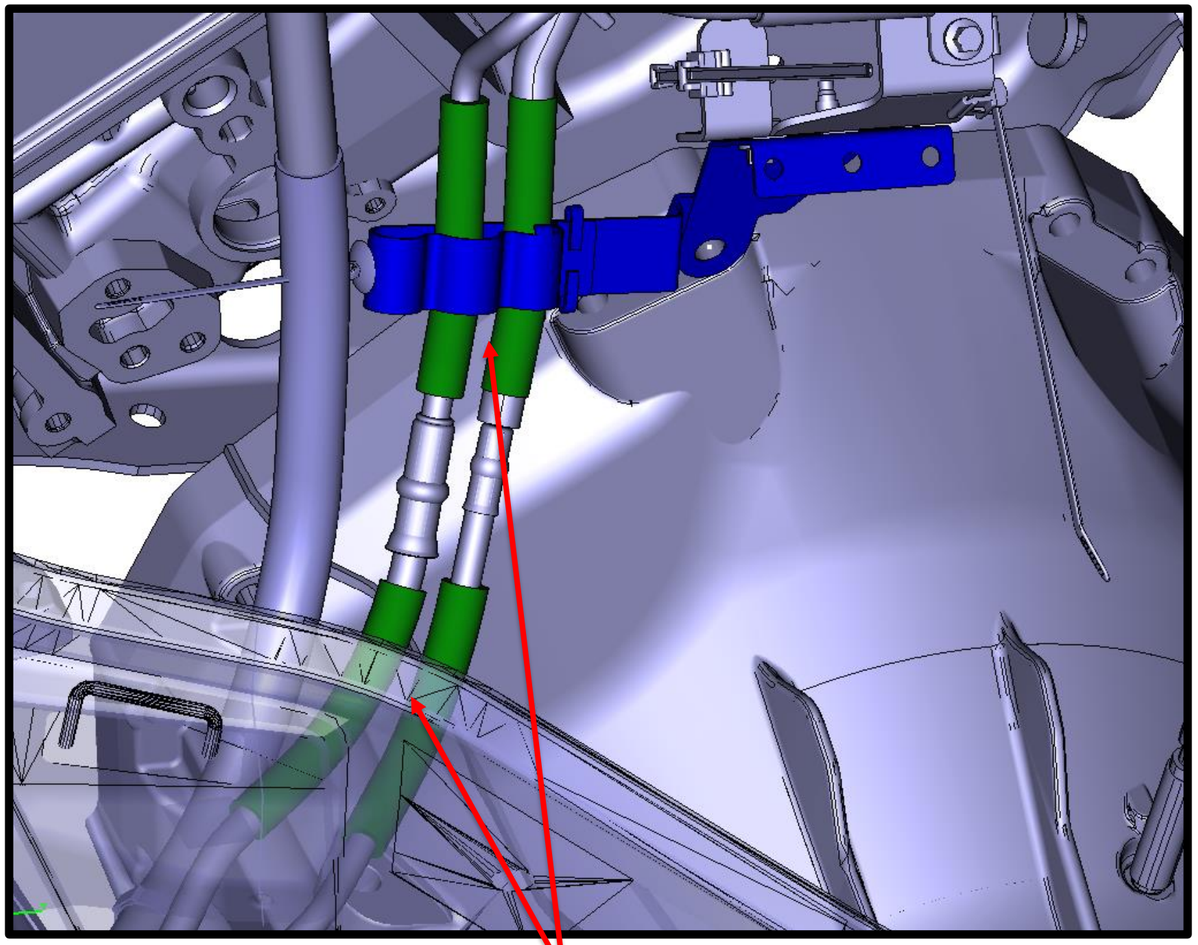


Install 9” long heat wrap (11-172-0002) onto the vapor line starting at the OEM fuel retention bracket as shown in the picture

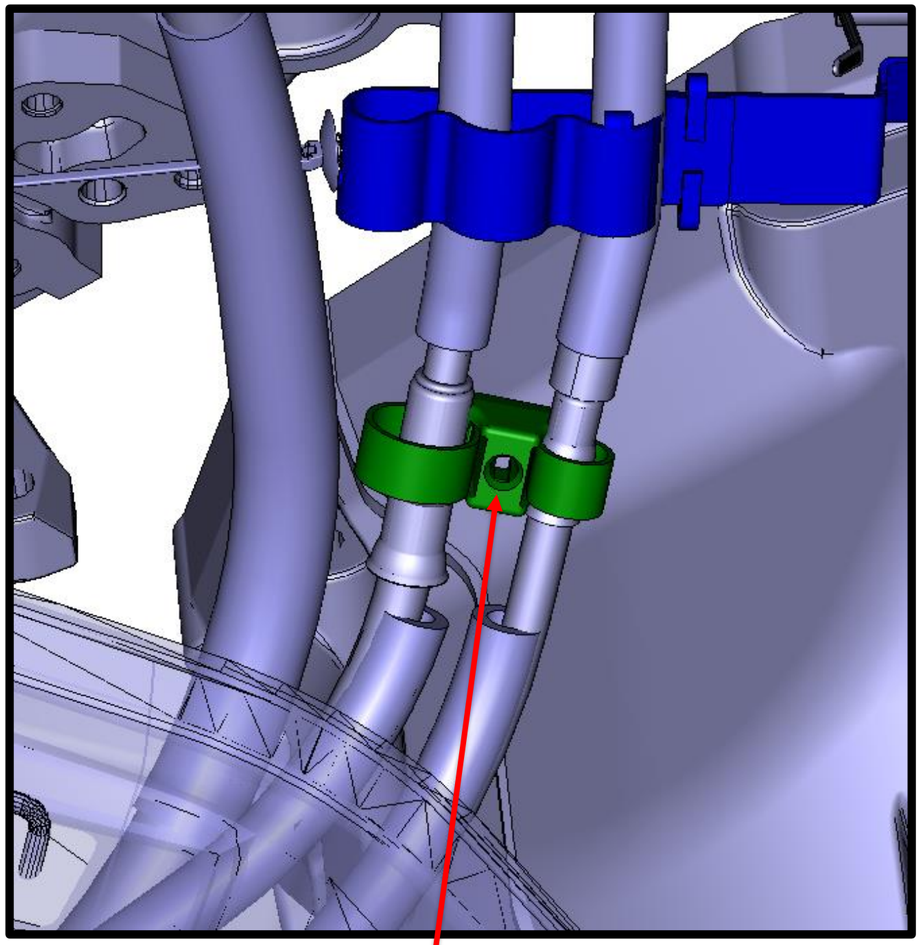


Route the new vapor line up alongside the transmission. Retain to the OEM transmission mounted fuel line retention bracket using a zip tie push tree (155-05800).

INSTALL FORWARD SUPPLY LINE RUBBER SLEEVE AND FUEL LINE HEAT WRAP

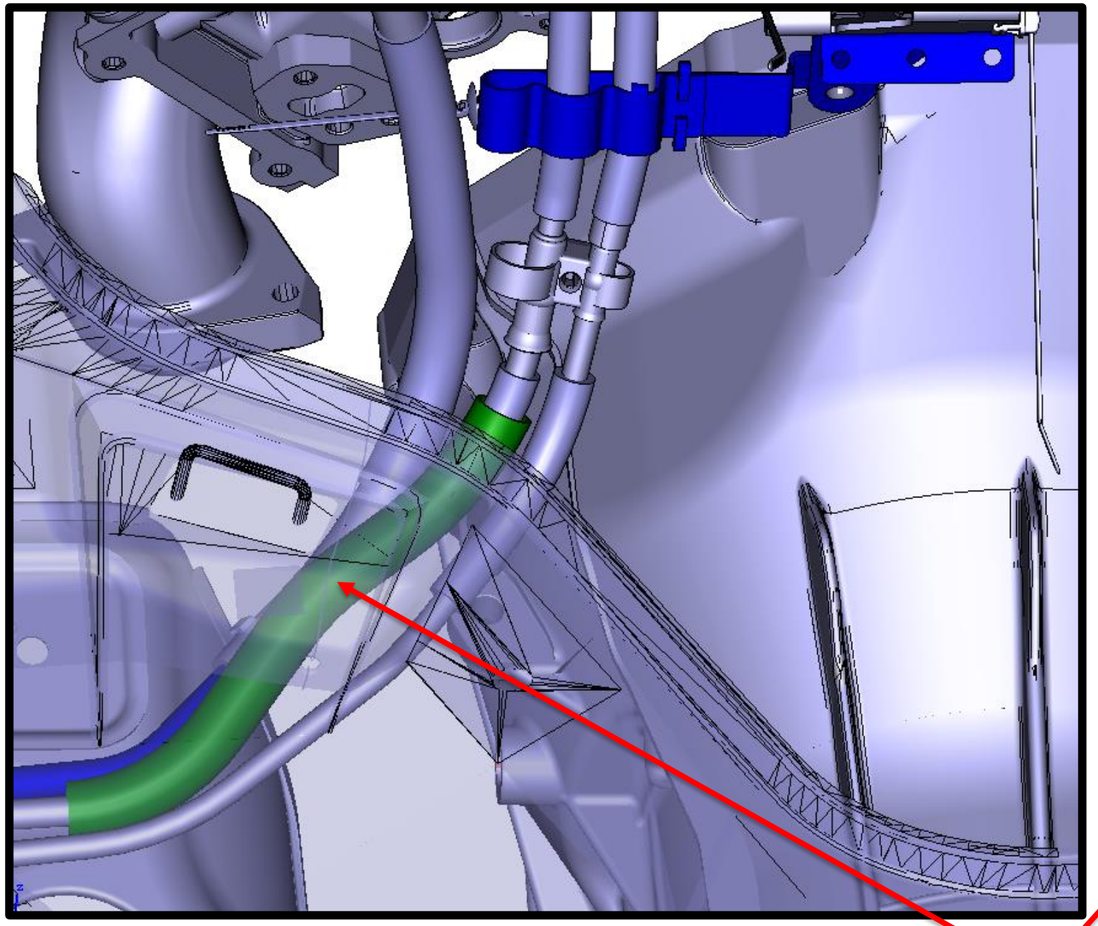


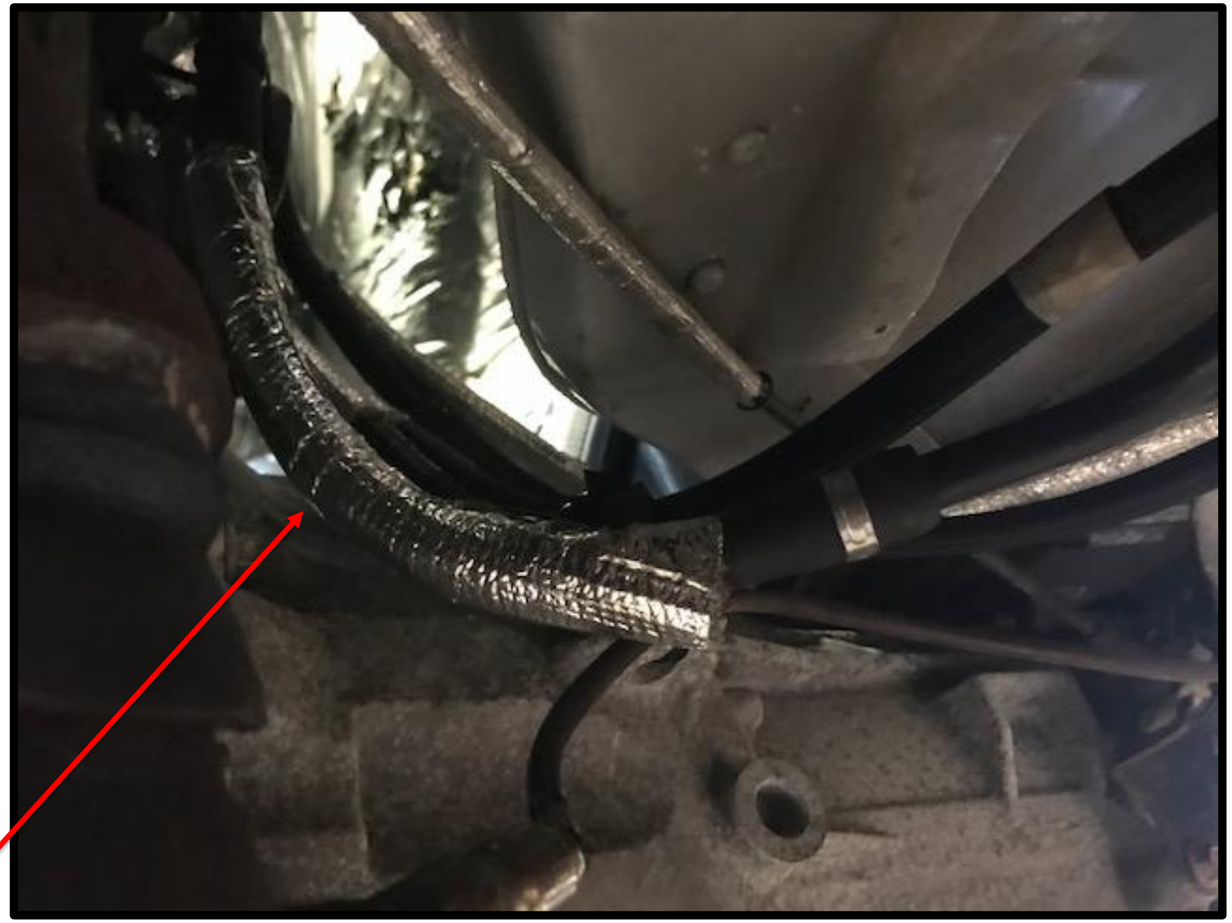
Install Qty 4 rubber sleeves (PBC2-9C328-A) on both the supply and return lines where the fuel line routes along the side of the transmission bell housing and inside the OEM retention bracket as shown.



Install a dual clamp tie (20-403-0004) on the crimps of the supply and return line below the OEM retention bracket as shown

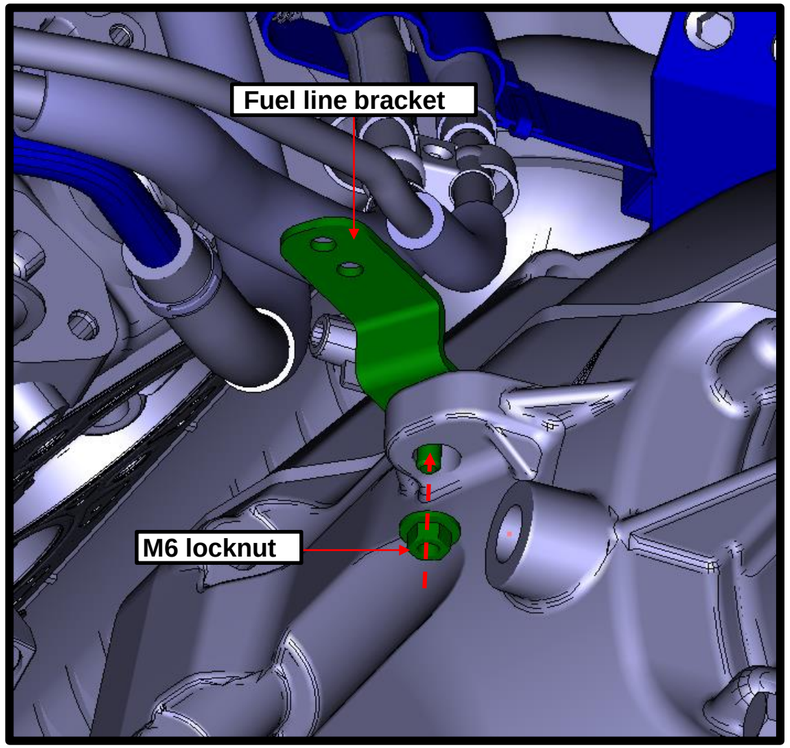
INSTALL FORWARD SUPPLY LINE RUBBER SLEEVE AND FUEL LINE HEAT WRAP CONT



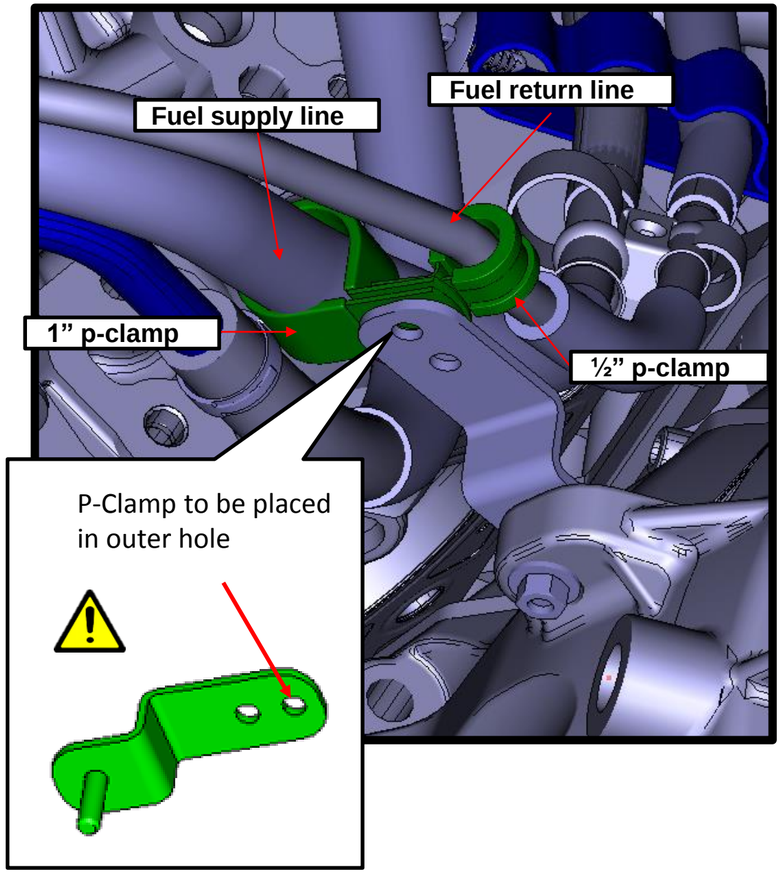


Install a 9” heat wrap (11-172-0002) on the supply line over the rubber sleeve as shown.

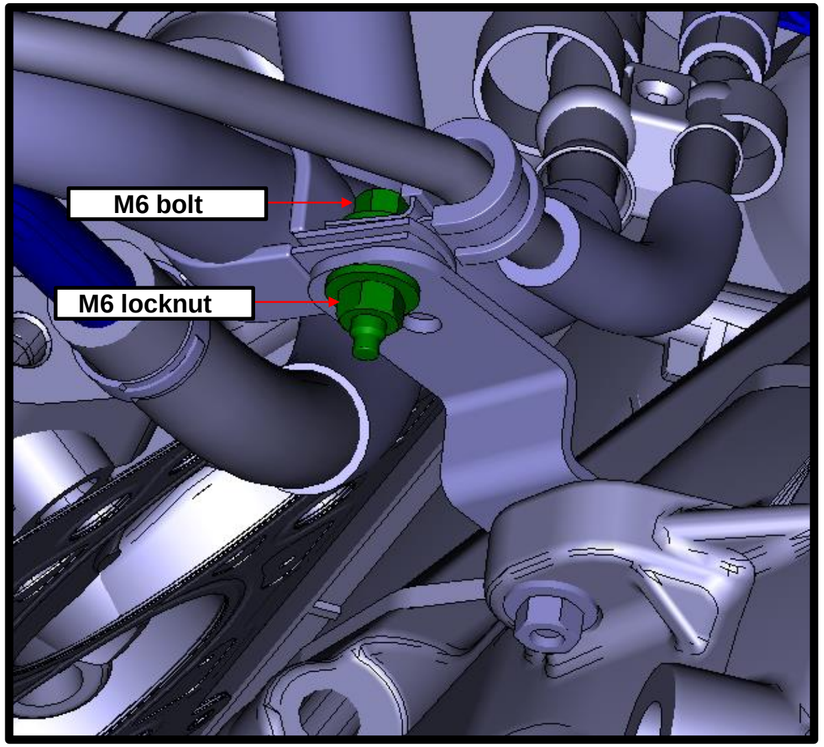
TRANSMISSION BRACKET INSTALLATION



Place fuel line bracket (P16JC-10F100-C) into transmission boss stud side down. Hand start the M6 locknut (W704521-S437)



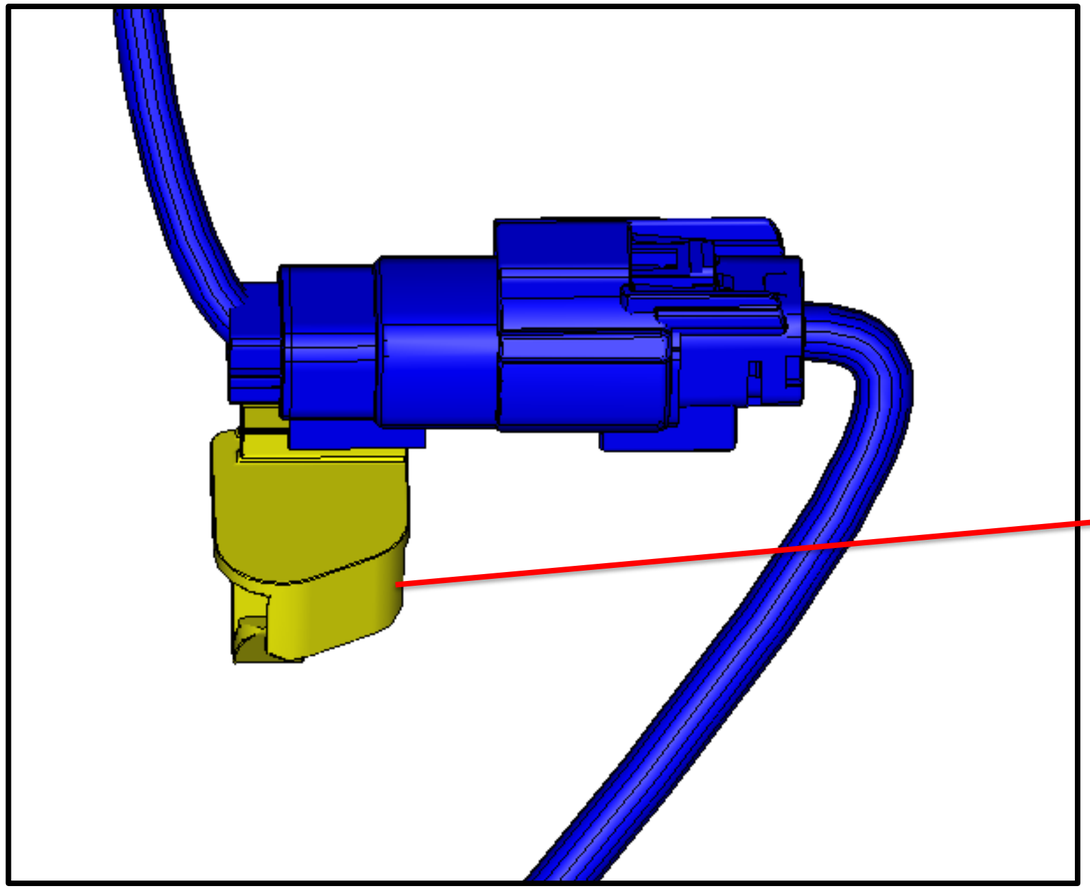
Place 1” p-clamp (11-056-0041) onto fuel supply line and ½” p-clamp (11-056-0048) onto fuel return line. Slide p-clamps along the fuel lines to align with outer hole on bracket. Note: 1” p-clamp should be between ½” p-clamp and bracket.



Secure p-clamps to the bracket with a M6 locknut (W704521-S437) and M6x20mm bolt (W500214-S437). Torque all M6 fasteners to 8-12 Nm.

TRANSMISSION BRACKET INSTALLATION

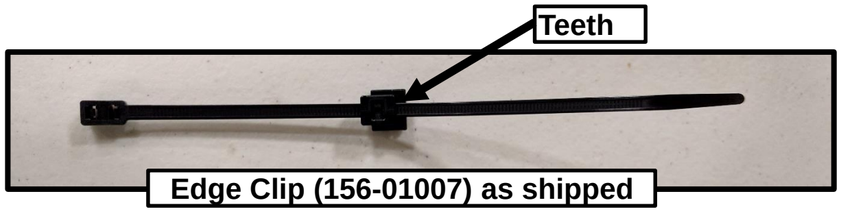
1. **Remove fir tree clip from OEM exhaust sensor connector by pushing tab and sliding out**

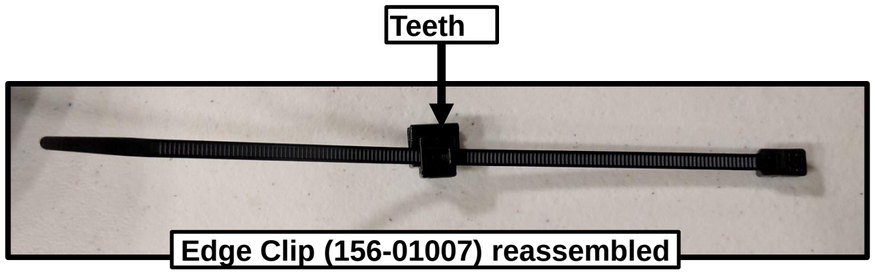


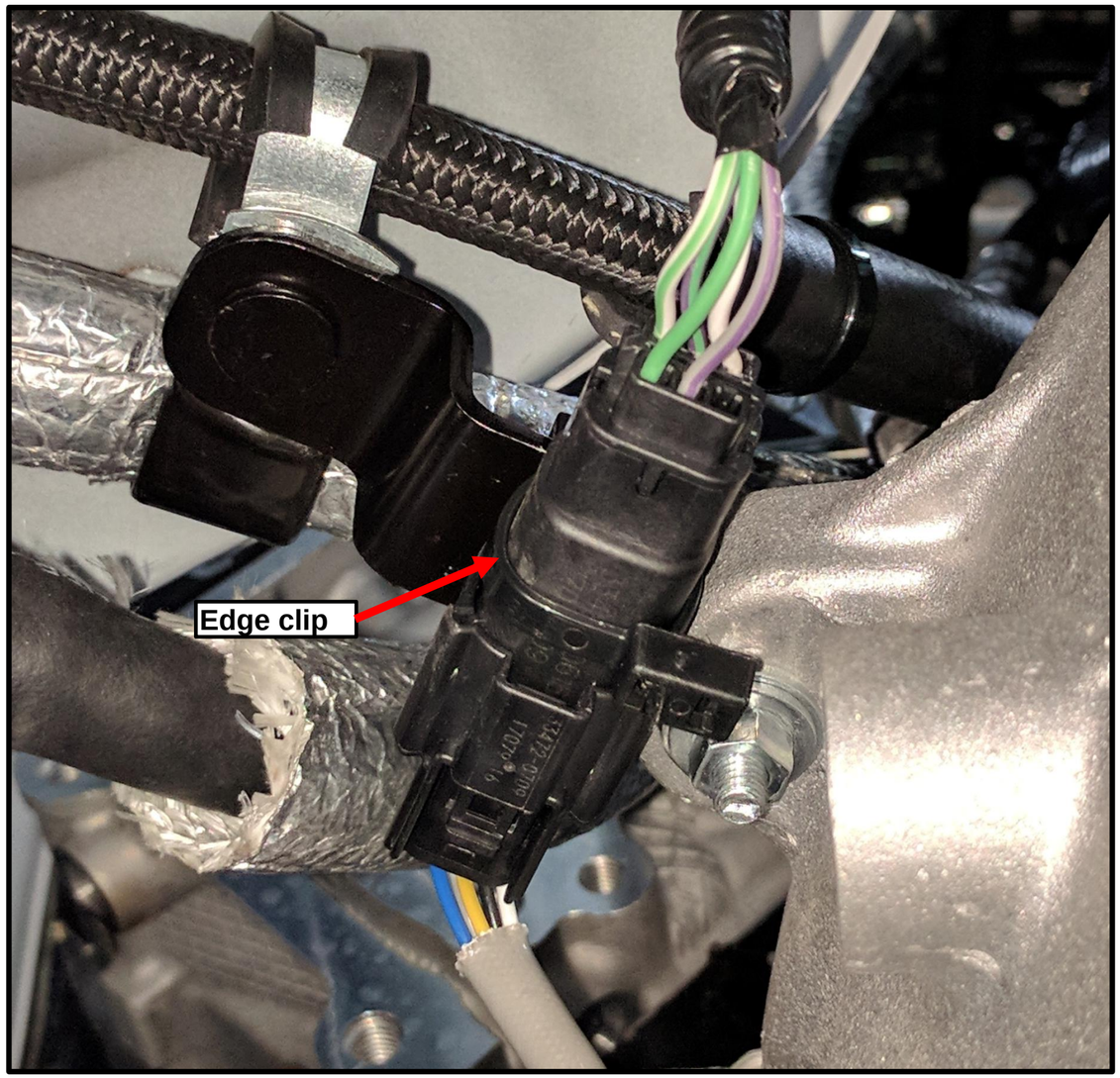
Fir tree clip removed from OEM exhaust sensor connector

TRANSMISSION BRACKET INSTALLATION

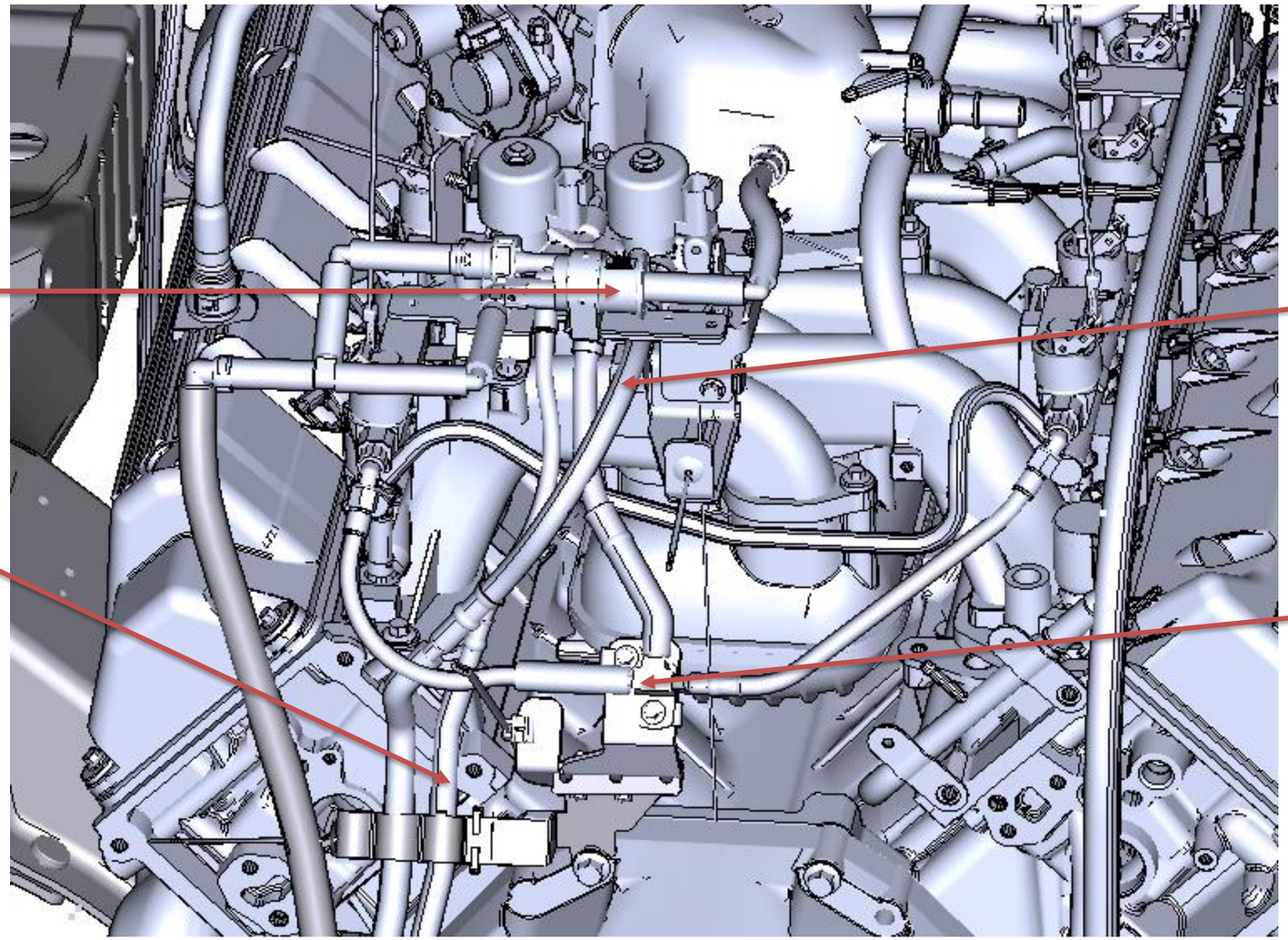
1. **Take edge clip zip tie (156-01007) and slide zip tie out and reinsert into edge clip in secondary orientation**
2. **Attach reassembled edge clip zip tie (156-01007) to rear side of bracket (P16JC-10F100-C)**
3. **Retain OEM exhaust sensor to edge clip.**





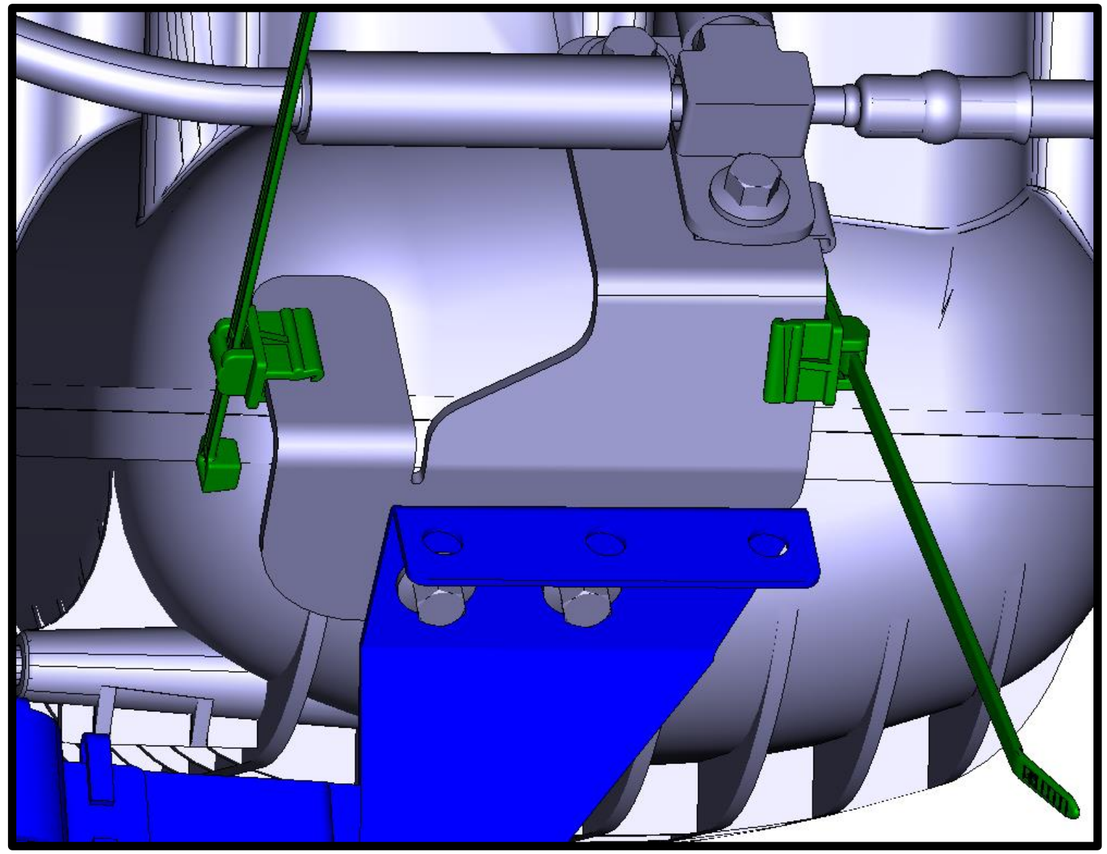


VERIFY THE ORIENTATION/POSITION OF THE FUEL LINES

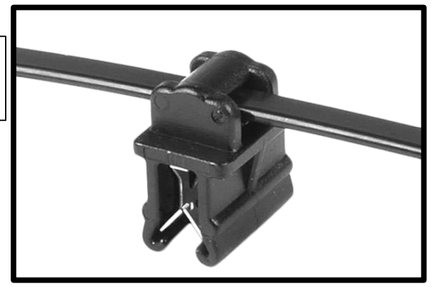


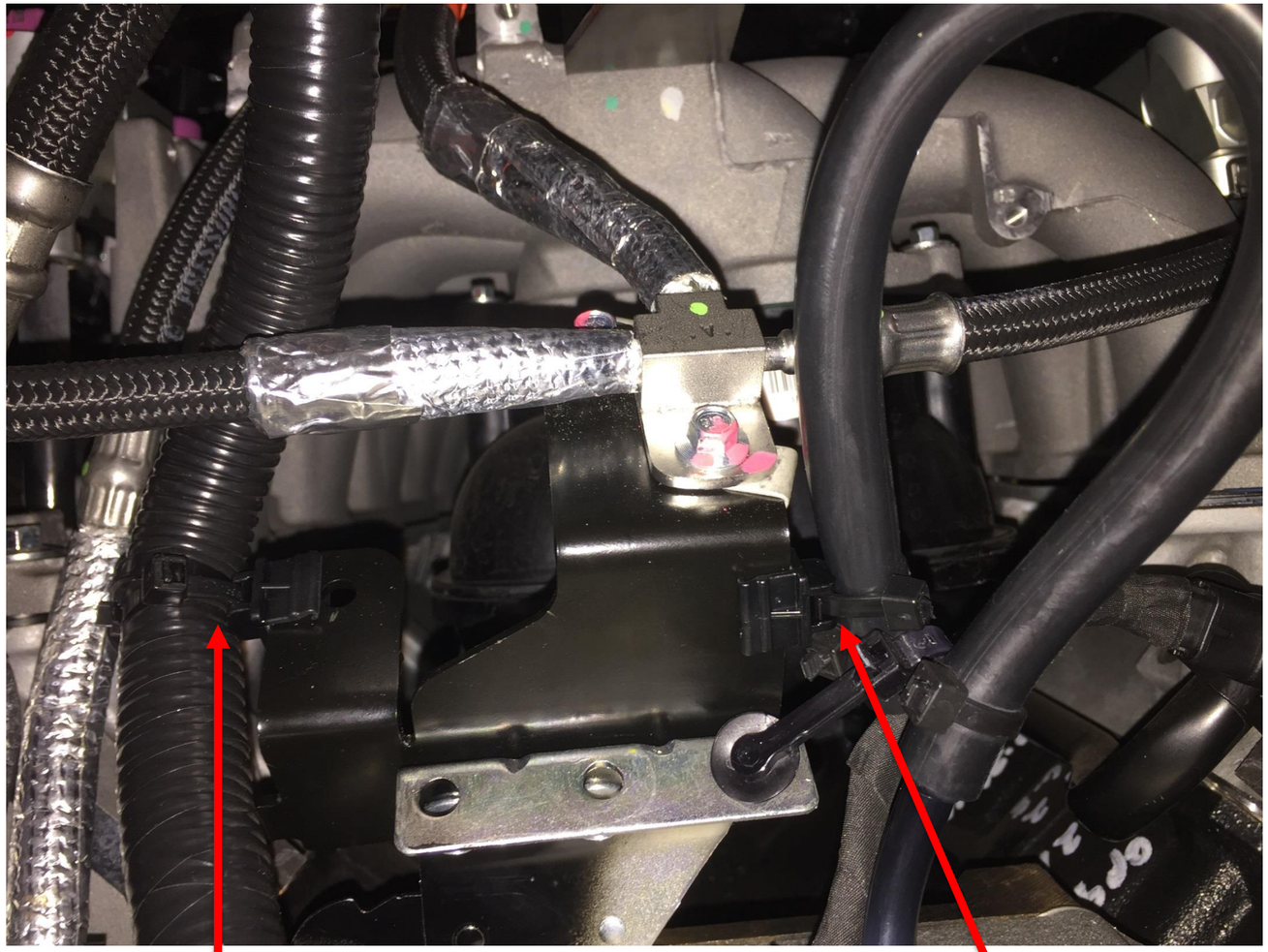
Ensure that fuel lines have minimum 5mm clearance to surrounding components

RETAIN OEM ENGINE HARNESS AND TRANS VENT TUBE TO FUEL LINE RETENTION BRACKET



Add qty 2 edge clip zip ties (156-00552) to fuel line retention bracket

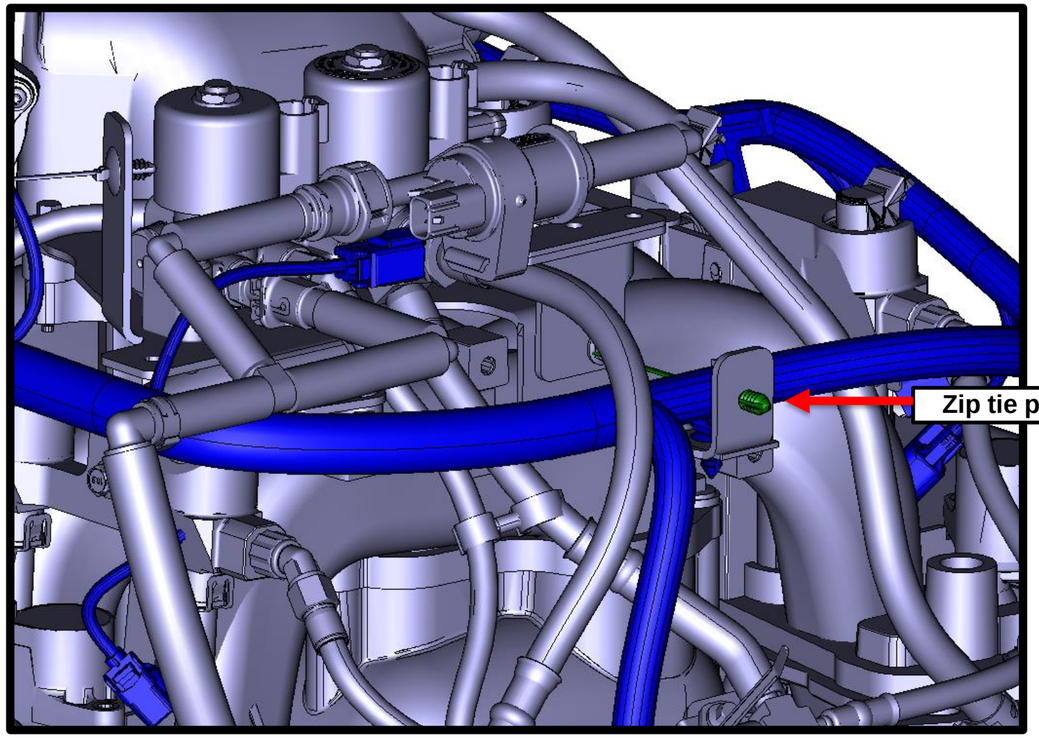


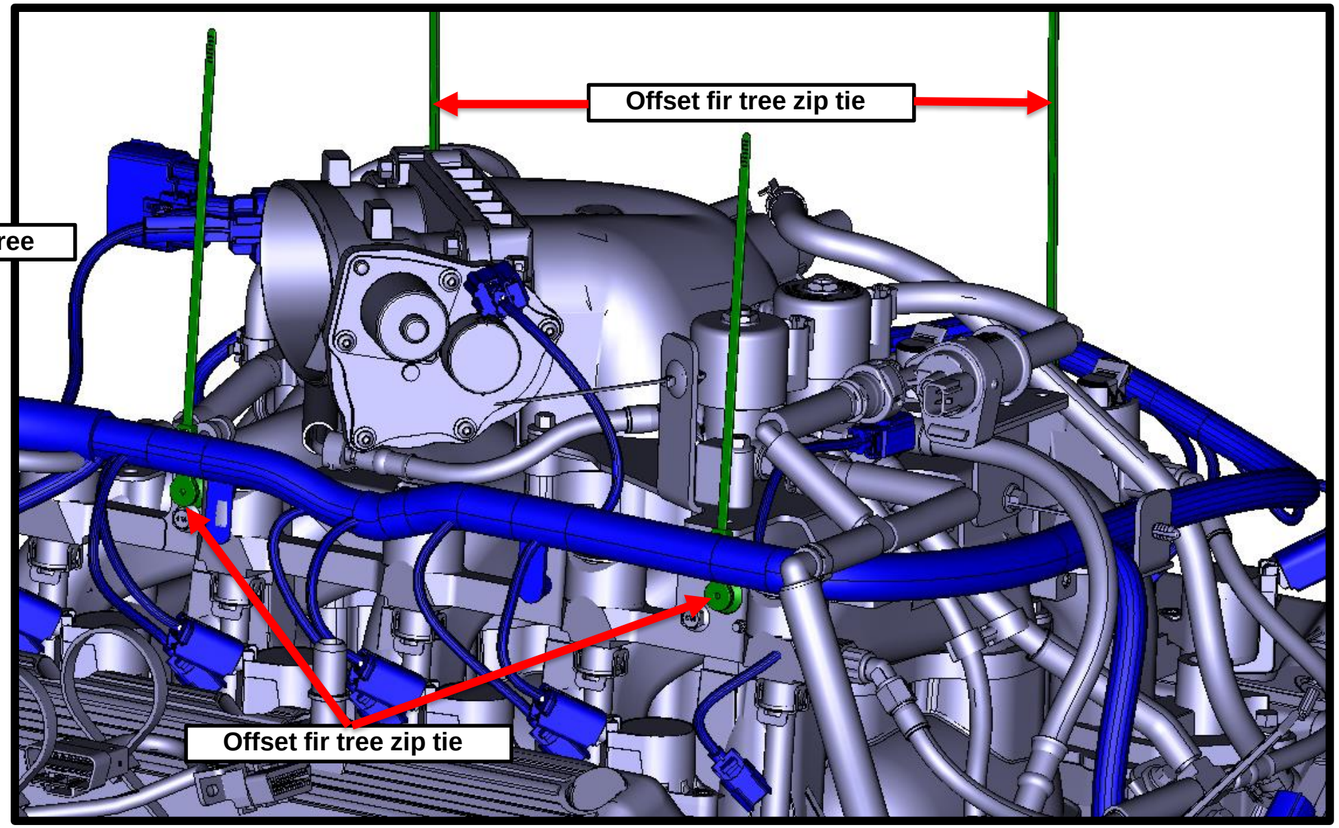


DISCARD REUSE NEW

POSITION AND ALIGN OEM ENGINE HARNESS

Inside Cab

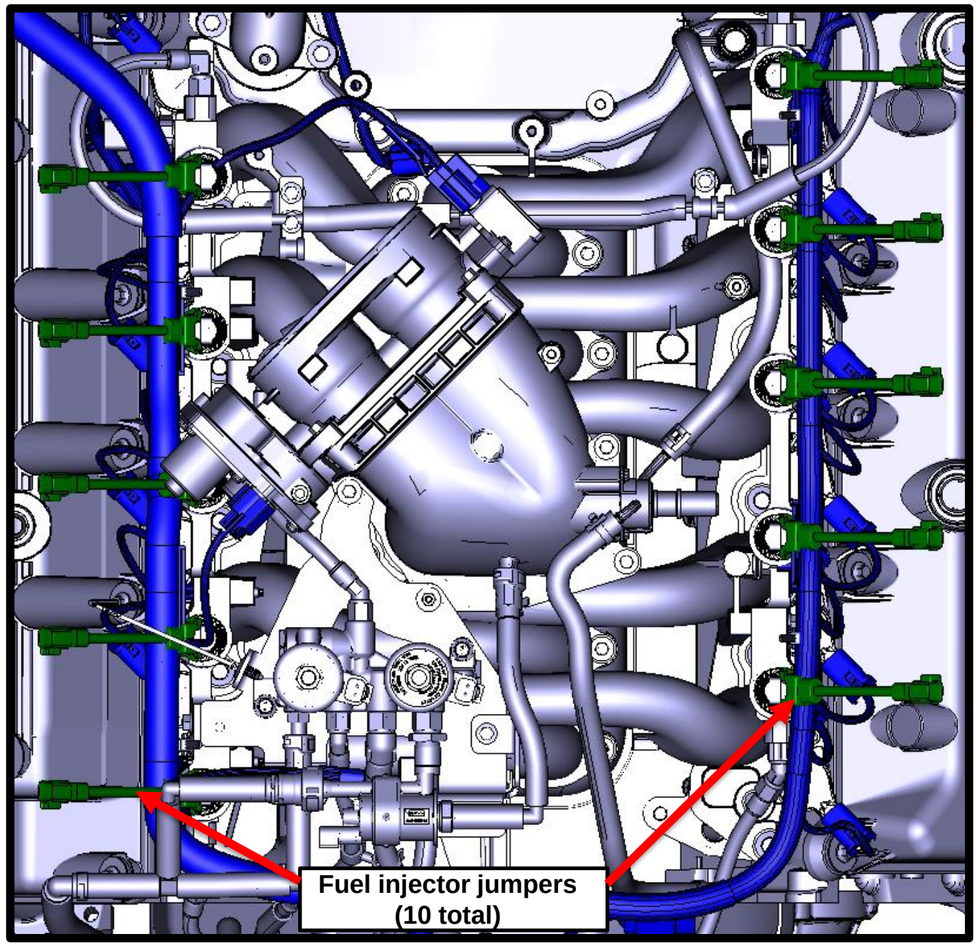




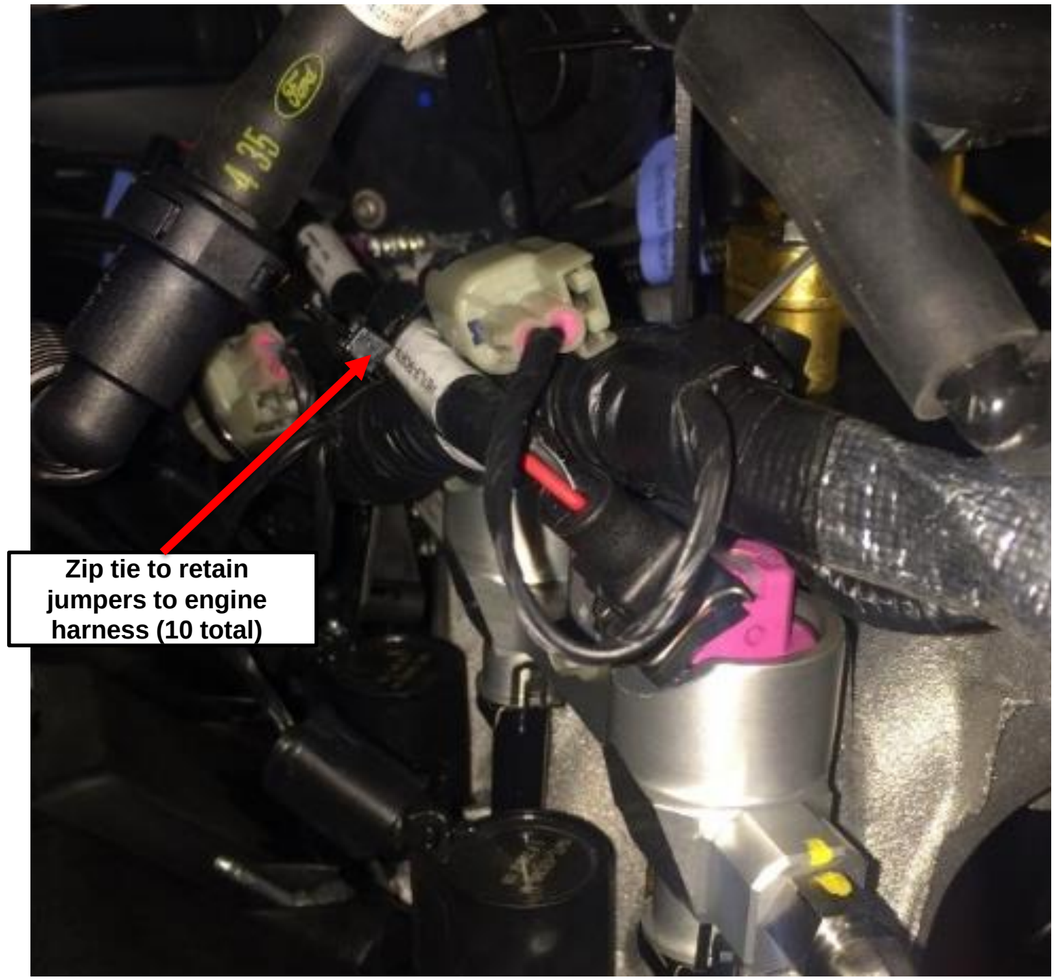
1. **Insert zip tie push tree (155-05800) into FRPCM bracket hole and retain OEM harness.**
2. **Install qty 4 offset fir tree zip ties (20-403-0013) into the holes on both the LH and RH fuel rails**

Note: do not tighten offset fir tree zip ties at this point

CONNECT INJECTOR JUMPERS



1. Connect qty 10 fuel injector jumpers (P07L3-9C978-A) to each OEM injector connector
2. Connect other end of fuel injector jumper to fuel injector



3. Retain engine wire harness into fuel rail by tightening the offset fir tree zip ties
4. Use qty 10 zip ties (20-403-0003) and retain fuel injector jumpers to engine wire harness, careful not to stress or damage wires.

ROUSH CLEANTECH WIRING HARNESS AND RETAINERS

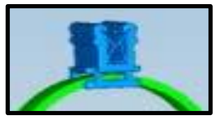
1. P16JC-18A100-AA Underhood harness-- Find the harness in the P16JC-ENGKIT-AA.
2. P16JC-18B100-AA CAN harness- - Find the harness int the P16JC-ENGKIT-AA
3. P16JC-18C200-AA Rear Frame harness- - Find the harness int the P16JC-FRAME-AA
4. P16JC-18K377-AA Tank harness- Find the harness int the P16JC-FRAME-AA

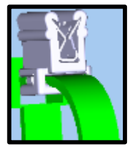
*** READ BEFORE STARTING THE INSTALLATION ***
There are only 3 types of retainers in the Electrical Kit to retain harnesses to truck.

1. Use Tie Straps (20-403-0003) to retain the harnesses as shown in the following pages. In most cases, the CleanTech harnesses are tie strapped to the OEM harness. These tie straps are also used to secure the Tank harness to the propane fuel tank.

.  Find the ZIP TIE, 11 3/4" LONG-STANDARD in the P16JC-ENGKIT-AA.

2. Use Plastic Edge Clips (20-403-0011 and 156-00552) to retain a portion of the Underhood harness. See following pictures.


156-00552

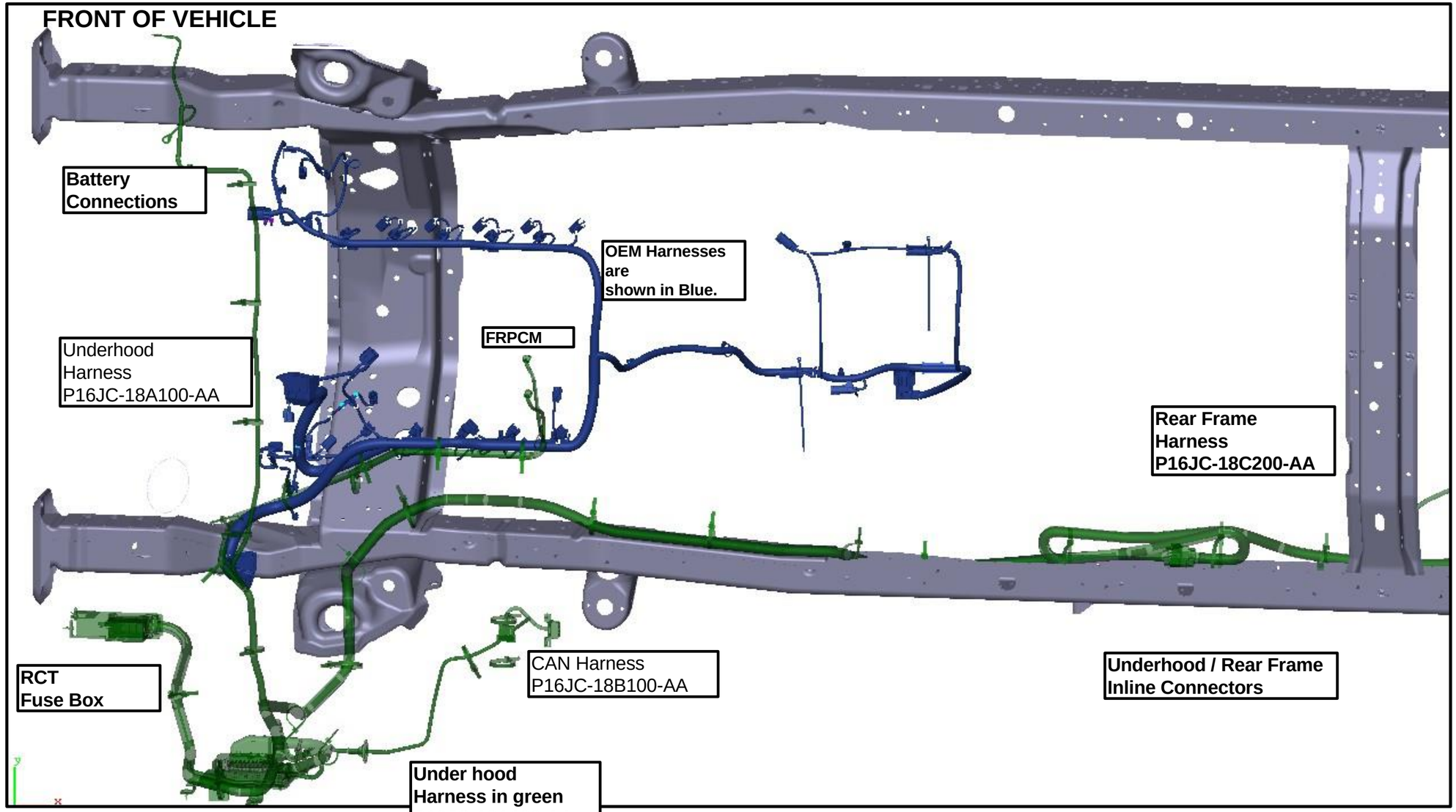

20-403-0011

1. Find the 156-00552, PLASTIC EDGE CLIP, 1-3 mm thick in the P16JC-ENGKIT-AA.
2. Find the 20-403-0011, PLASTIC EDGE CLIP, 1-3 mm thick in the P16JC-ENGKIT-AA.

3. Use Metal Edge Clips (11-056-0044) to retain a portion of the Rear Frame harness. Note that a tie strap does not come attached to metal edge clip like the plastic edge clip. You'll need to insert a tie strap (20-403-0003) into metal edge clip in the orientation shown in following pictures. Insert clip picture.

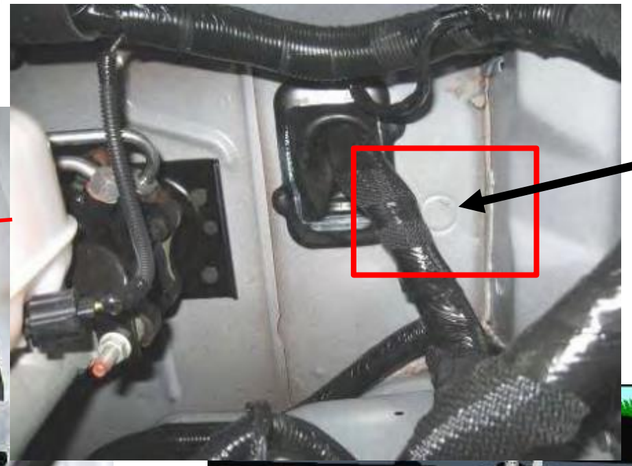
 Find the in Metal Edge Clips (11-056-0044) the P16JC-FRAME-AA

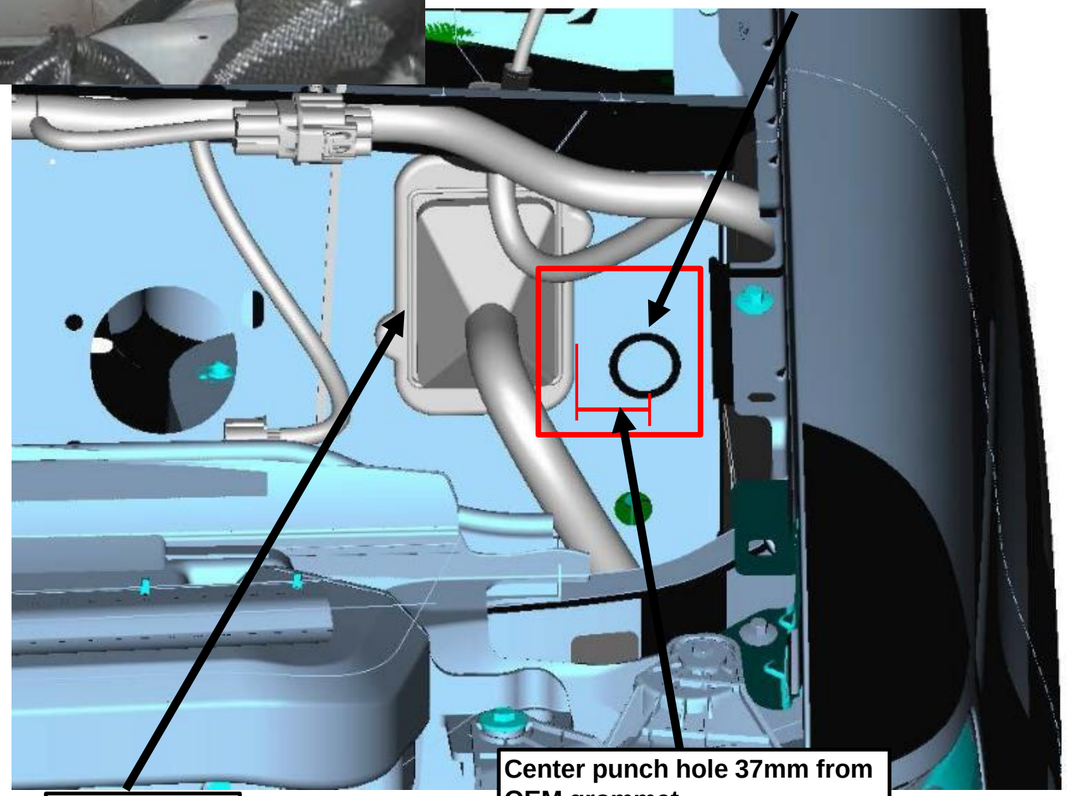
E-450 WIRING INSTALLATION OVERVIEW



DISCARD REUSE NEW

REMOVE RESERVOIR AND DRILL 29MM HOLE





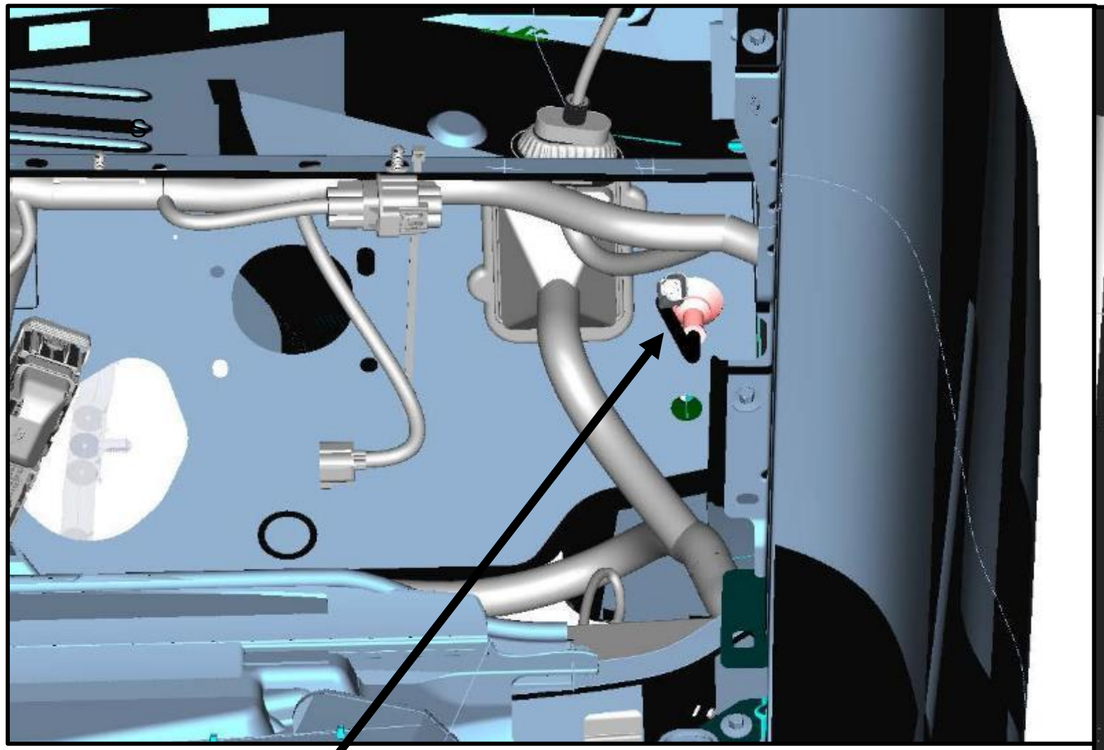
1.Remove and retain the three degas bottle mounting fasteners. Lay degas bottle on top of the brake master cylinder .

2. Drill a 29 mm (1-1/8”) hole in dash panel to the right OEM grommet as shown.

Note- Prior to drilling hole ensure there is nothing behind area hole is being drilled on inside of cab.

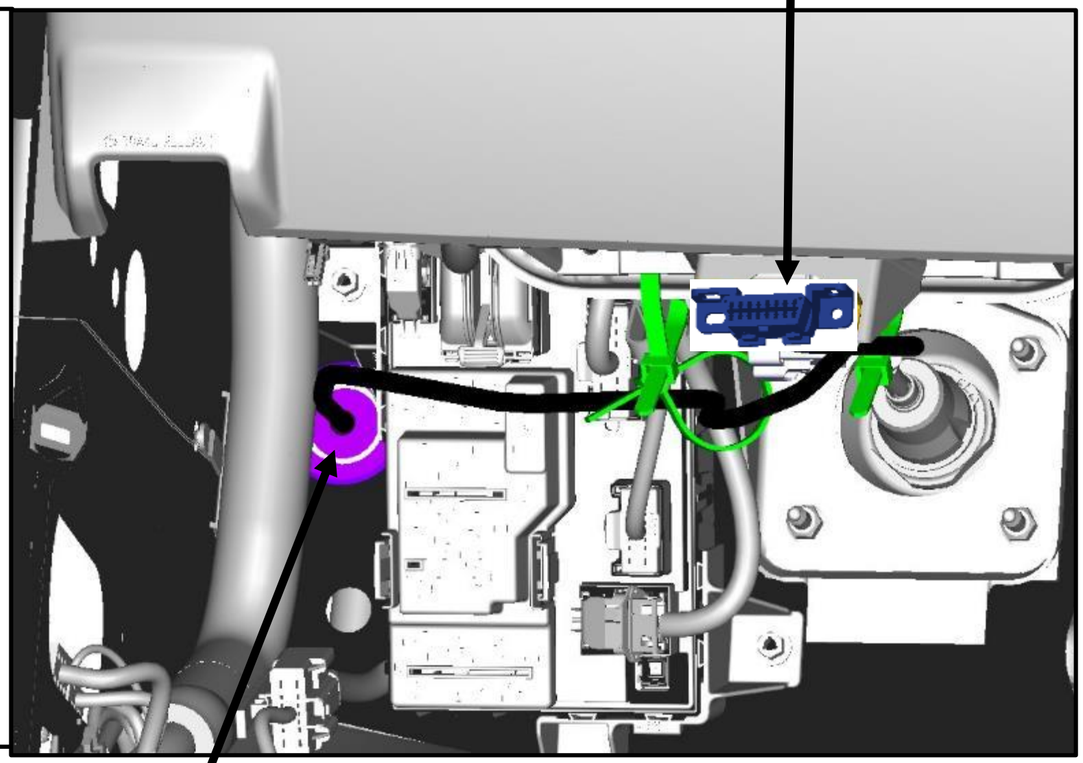
INSTALL CAN HARNESS

View From Engine Bay



Step 1- From inside the cab, take the 2-pin connector that is nearest to the harness gromment and feed it thru the 29mm hole. From engine compartment, grab 2-pin connector and pull harness to seat grommet as shown.

View From Drivers foot well

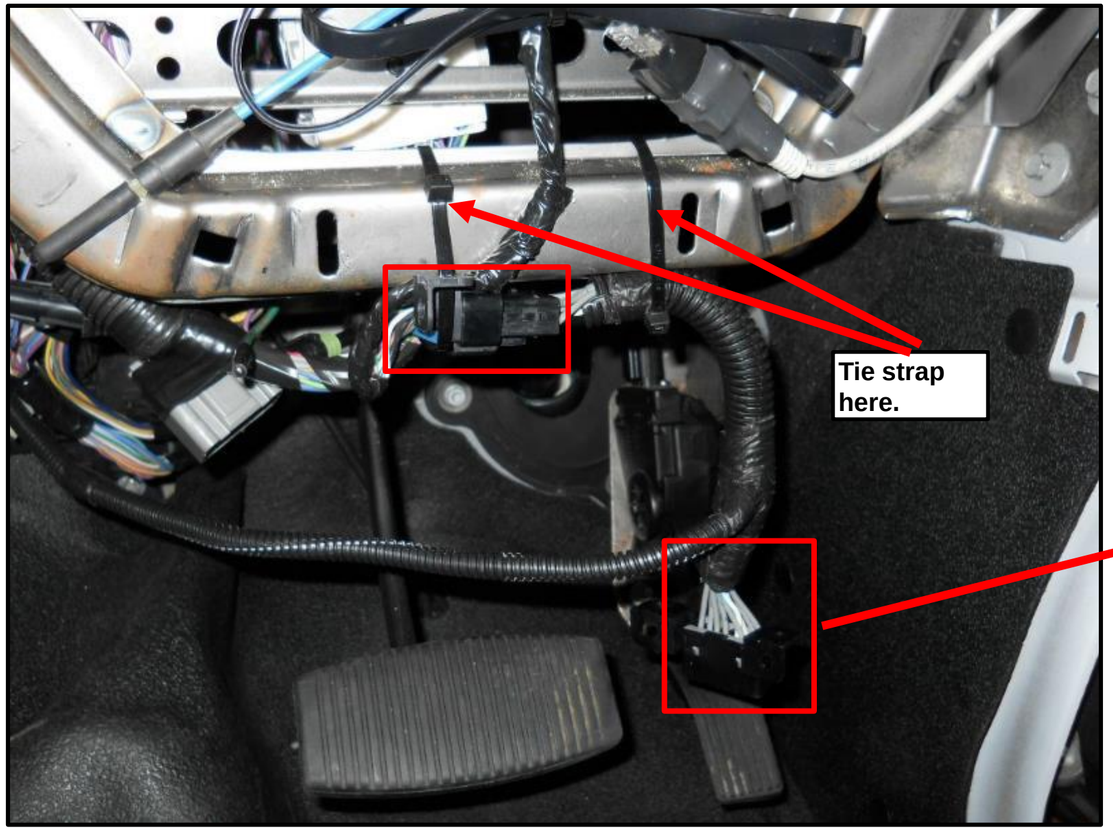


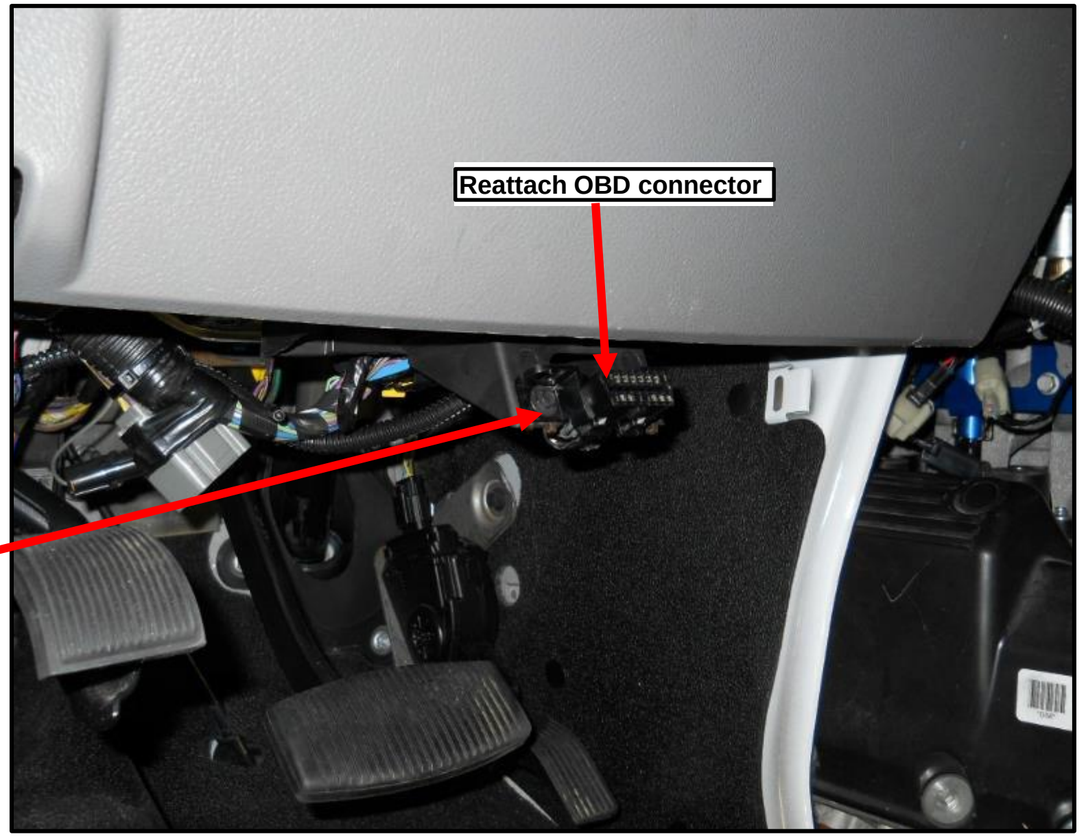
Unscrew and remove OEM OBD diagnostic connector. Keep hardware to attach CAN harness OBD connector in same location.

Harness grommet.

See next page for reference.

INSTALL AND RETAIN CAN HARNESS

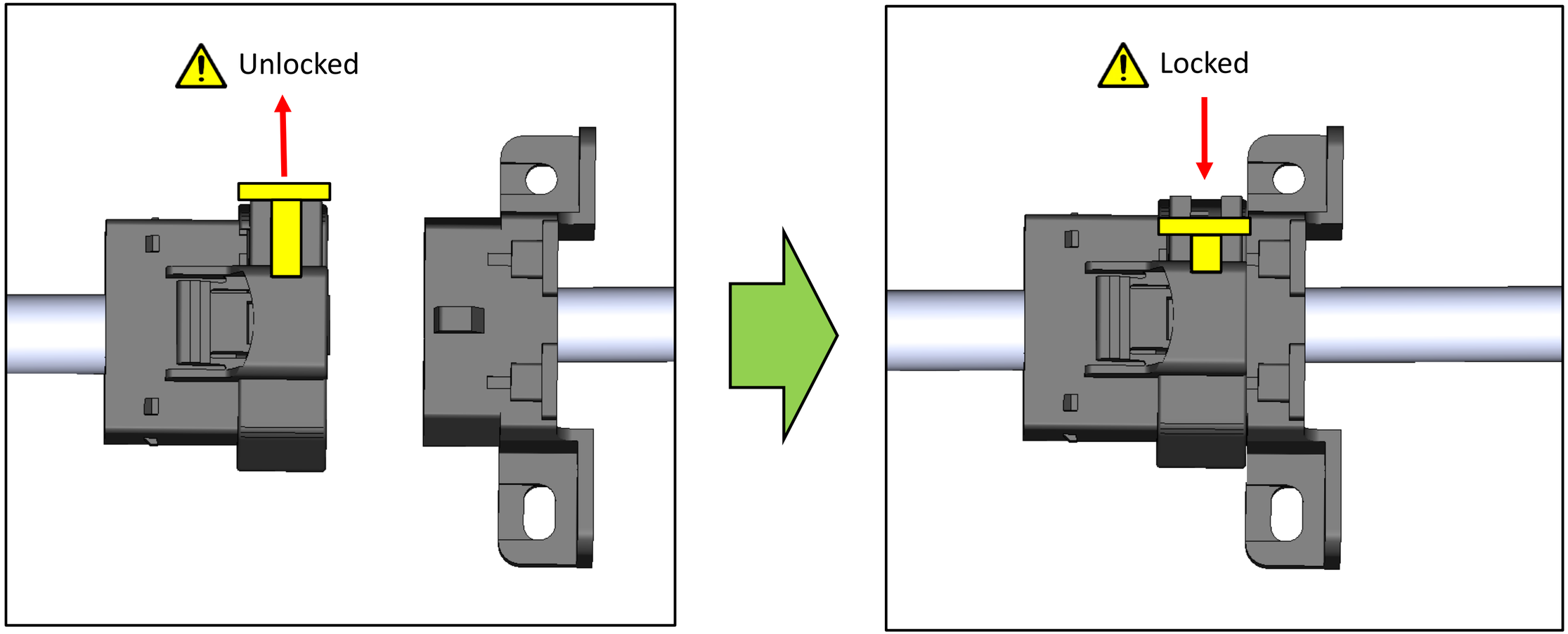




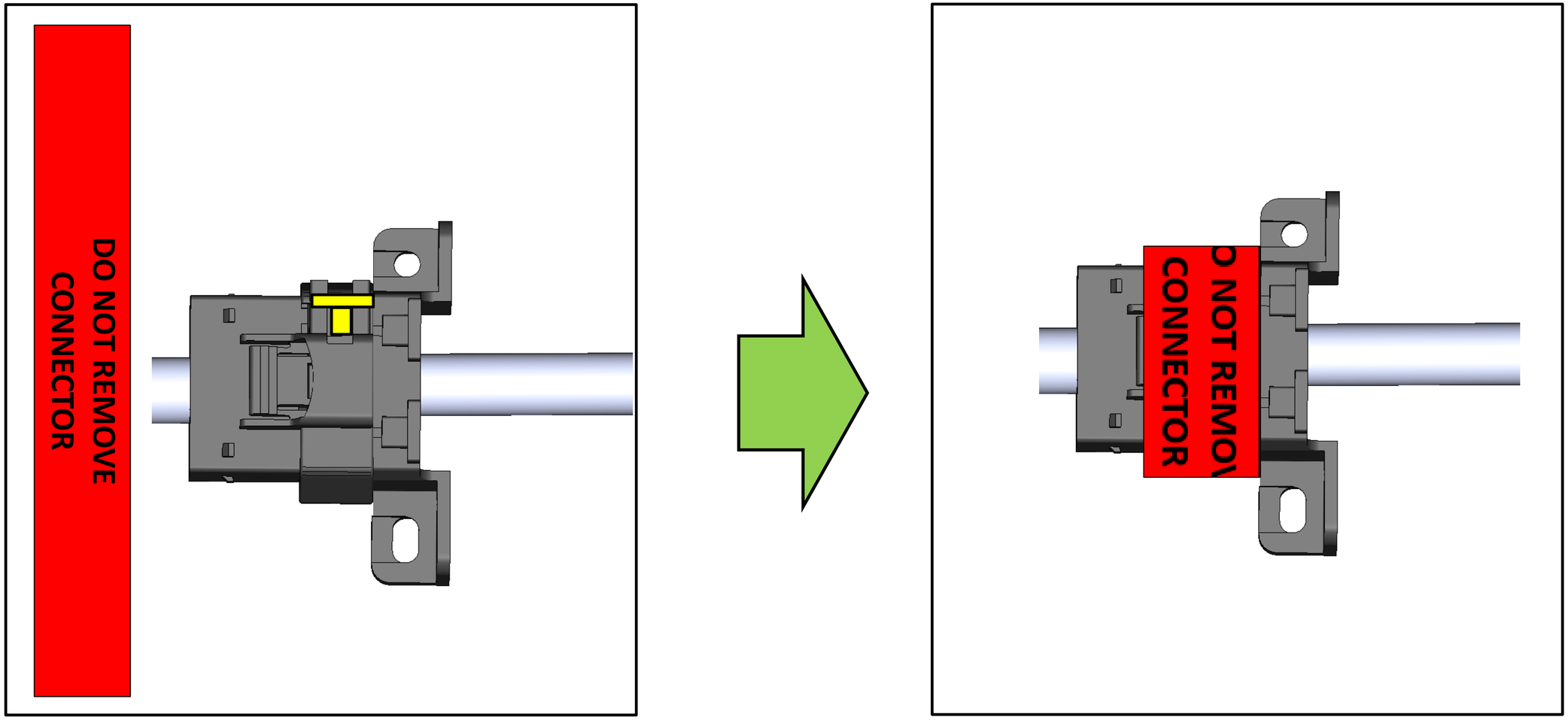
1.Remove the trim panel. (*Refer to Ford Work Shop Manual for instructions*).
2.Plug OEM OBD diagnostic connector into CAN harness male OBD connector. Tie strap mated connectors on each side to IP bracket as shown.
3.Set the yellow connector lock in place (see next slide).

4. Retain CAN harness to OEM harness with zip ties (Quantity 2).
5. Attach the Trim panel.
6. Attach the CAN harness OBD connector to the bracket.

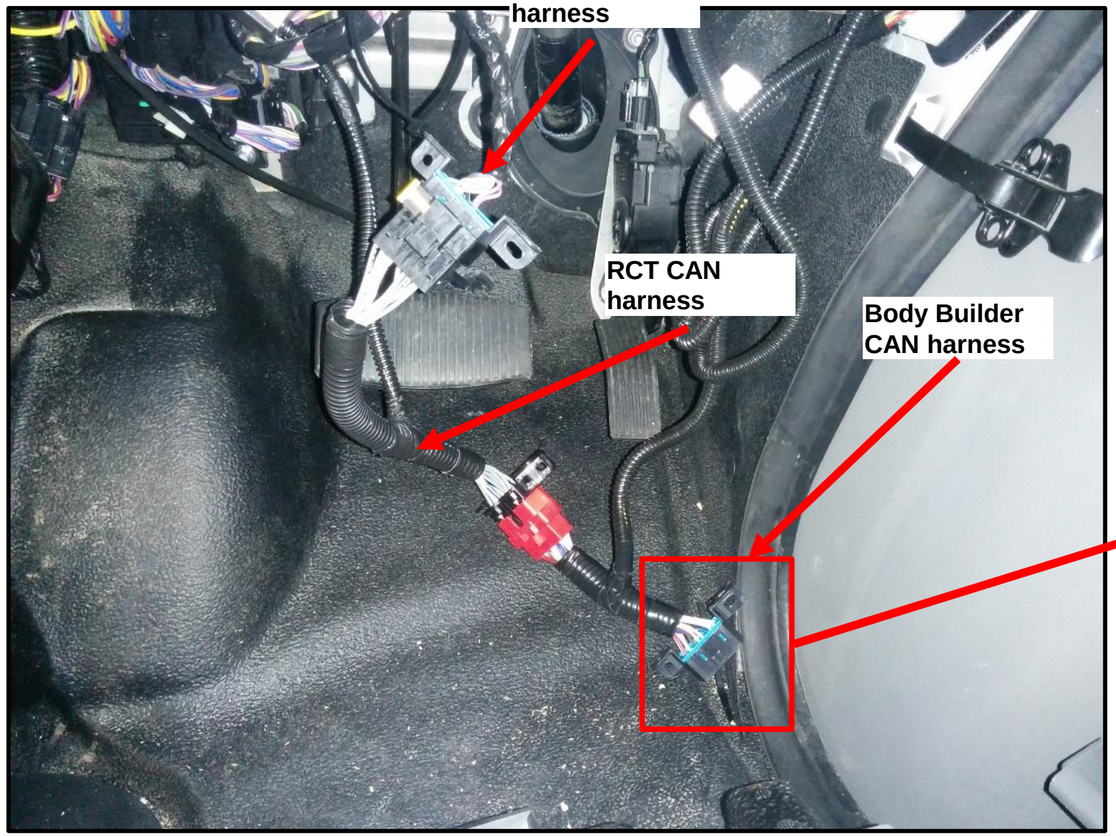
NOTE: ENSURE THAT THE CAN HARNESS IS LOCKED AS SHOWN IN THE IMAGES BELOW



APPLY LABEL TO RCT CAN HARNESS



INSTALL AND RETAIN CAN HARNESS – ALTERNATE INSTALLATION

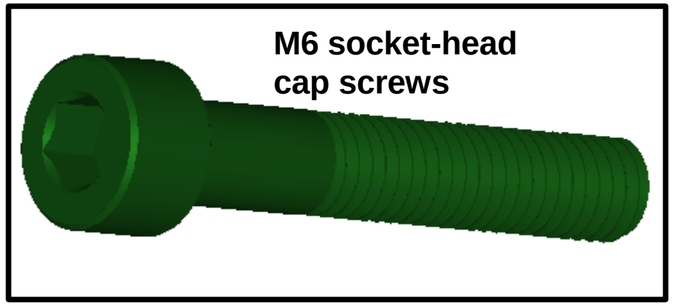


If vehicle equipped with Body Builder CAN harness, connect RCT and OEM harness together and then to Body Builder CAN harness

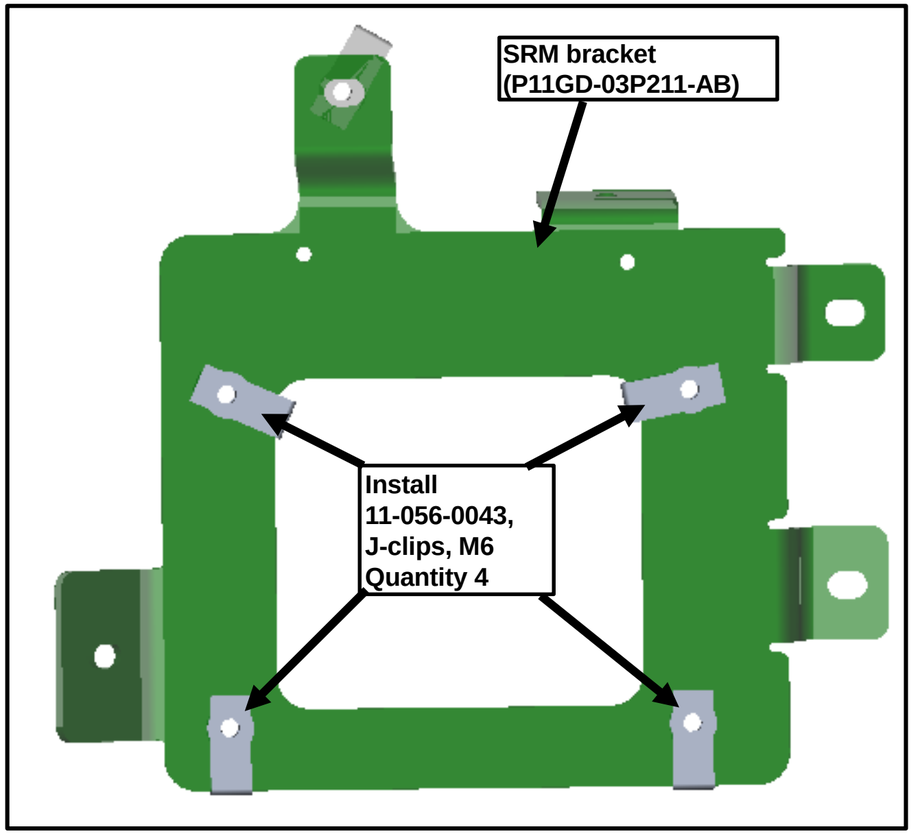
Next, apply "DO NOT REMOVE CONNECTOR" label over RCT connector (see next slide)

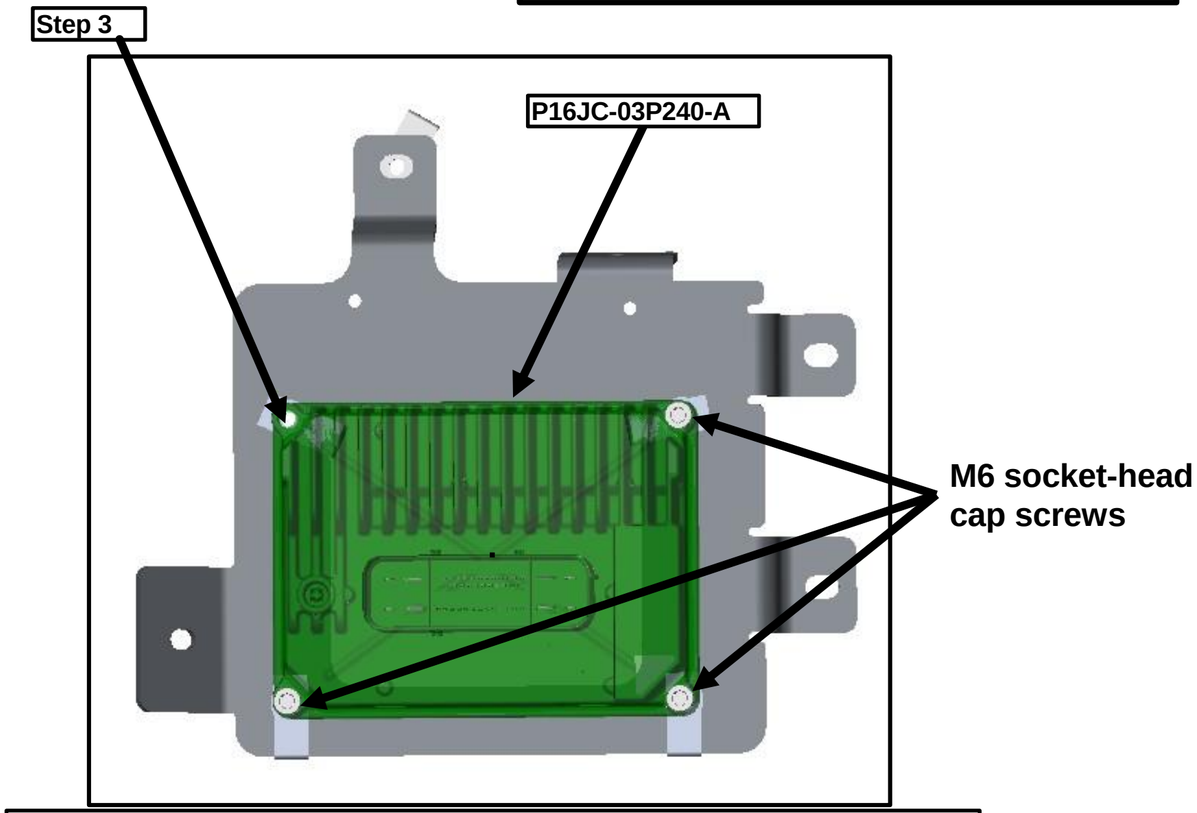
INSTALL SRM, SRM BRACKET

1. Assemble SRM to SRM bracket using four M6 socket-head capscrews, washers and nylon-insert locknuts. Torque to 8 to 12 Nm.
2. Please orient and mount SRM module to bracket as shown.
3. Leave cap screw off. Use later with Under hood harness assembly.



On Bench

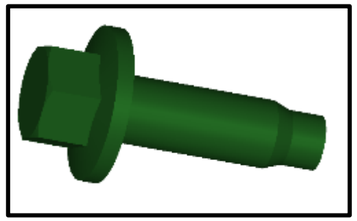




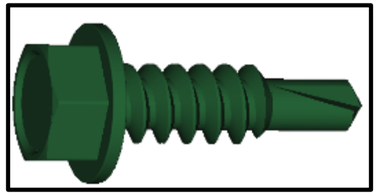
Note- Find all the necessary hardware in P16JC-ENGKIT-AA.

INSTALL SRM AND FUSE BOX

1. Remove retainer clip securing Ford wiring harness to inner fender and install one M6 x 1 J- clip in retainer hole.
2. Place SRM and bracket assembly in position on inner fender and install one M6 x 1.0 x 16 bolt in top rear hole (hole with J-clip).
3. Install an M6 x 16 self-tapping screw in each of three remaining mounting holes.
4. Install one M6 x 1 J-clip in hole at top of body flange (between fuse box and radiator).
5. Install auxiliary fuse box bracket with an M6 x 16 bolt in the top hole.
6. Drill a pilot hole and install an M6 x 16 self-tapping screw (91324A580) in lower mounting hole to secure bracket.



M6 x 1.0 x 16 bolt



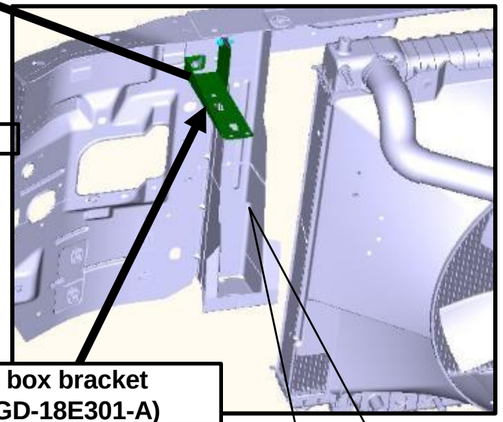
M6 x 16 self tapping screw

Step 1

M6 x 1 J-clip
(11-056-0043) (for top hole of SRM bracket)

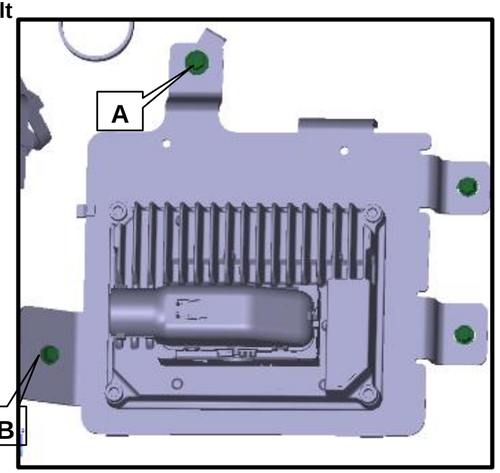
Steps 2 and 3

Steps 4,5 and 6



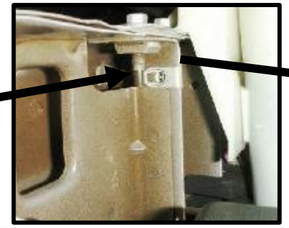
Fuse box bracket
(P11GD-18E301-A)

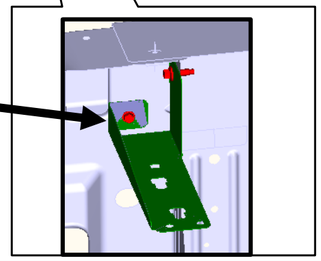
A – M6 x 1.0 x 16 bolt
Tighten to 8–12 Nm.
B – M6 x 16 self tapping screw



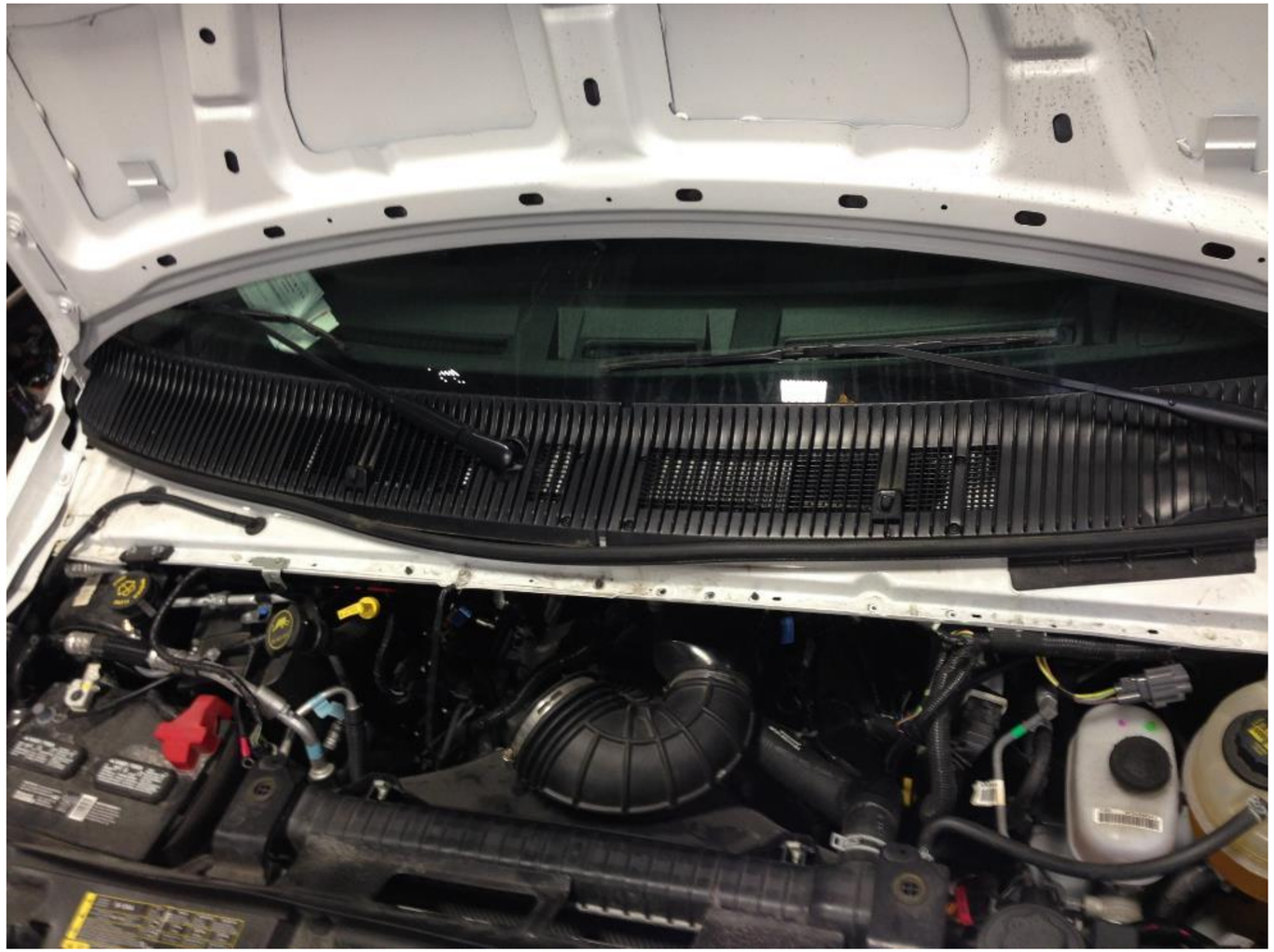
Note- Find all the necessary hardware in P16JC-ENGKIT-AA.

M6 x 1 J-clip
(W520822-S439



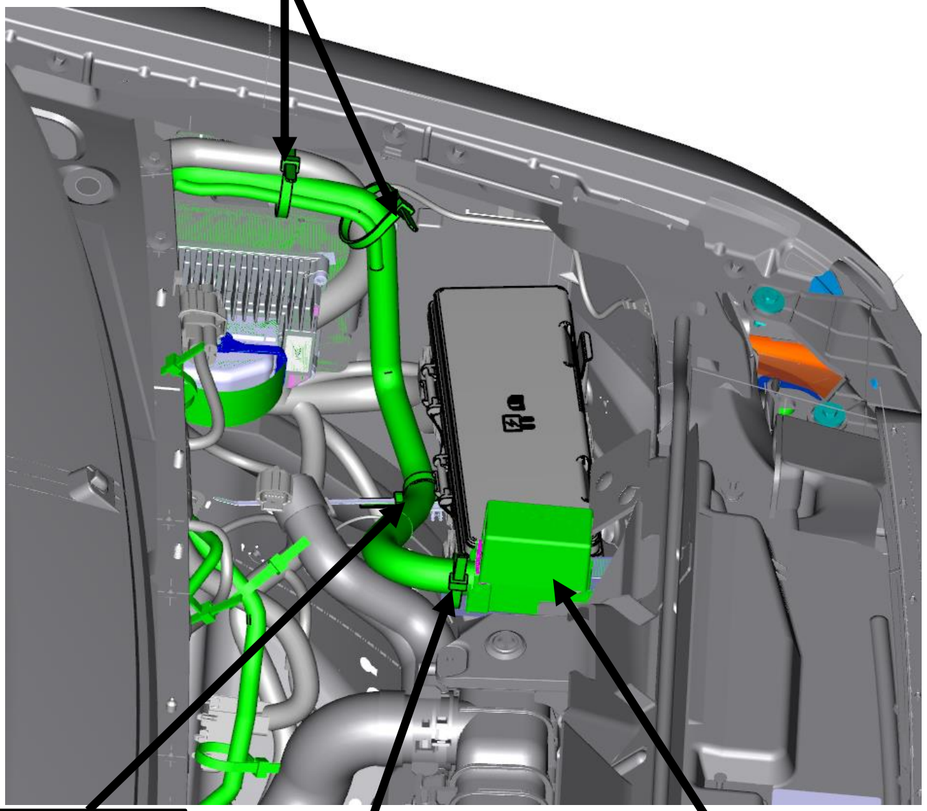


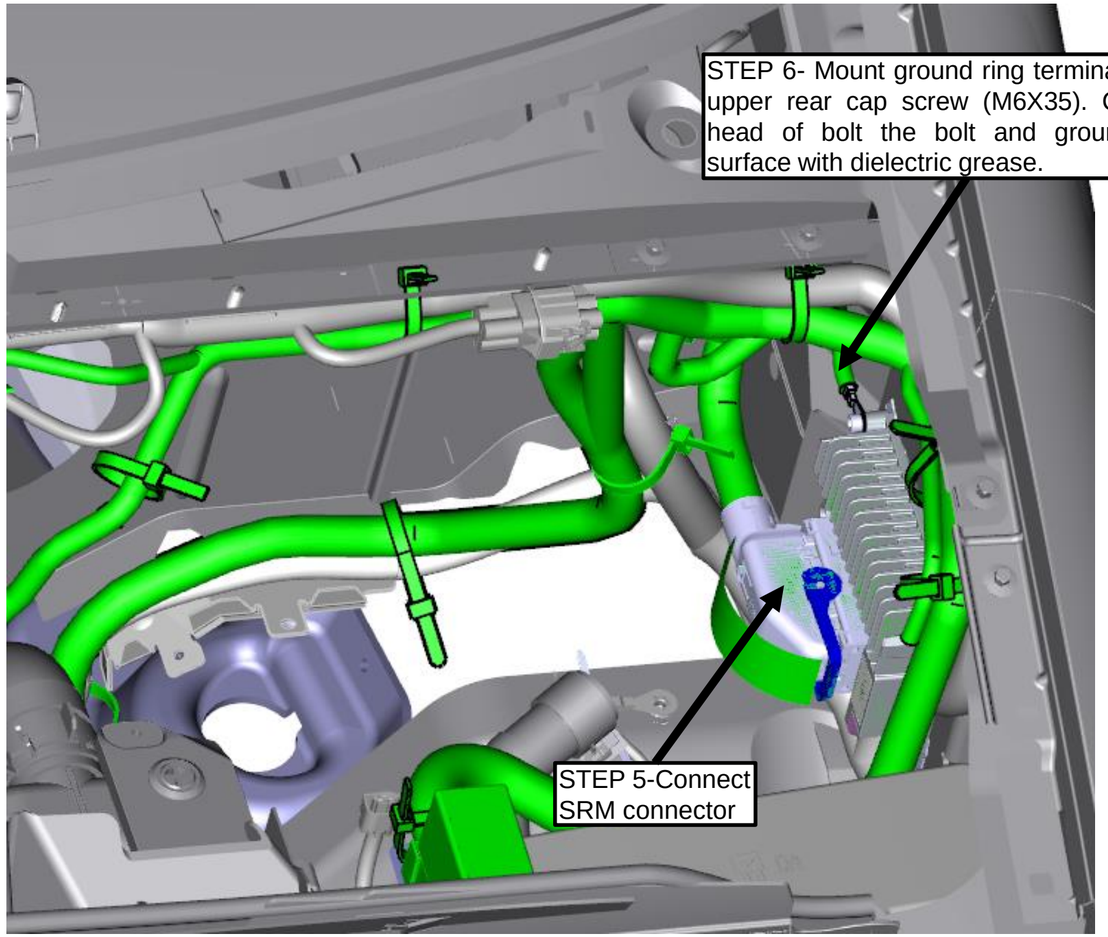
OVERVIEW OF UNDERHOOD HARNESS



1. In the next 5 pages, instructions are given to install electrical harness from driver end to passenger end.
2. It includes, installing harness from SRM to Fuel rails to Battery.

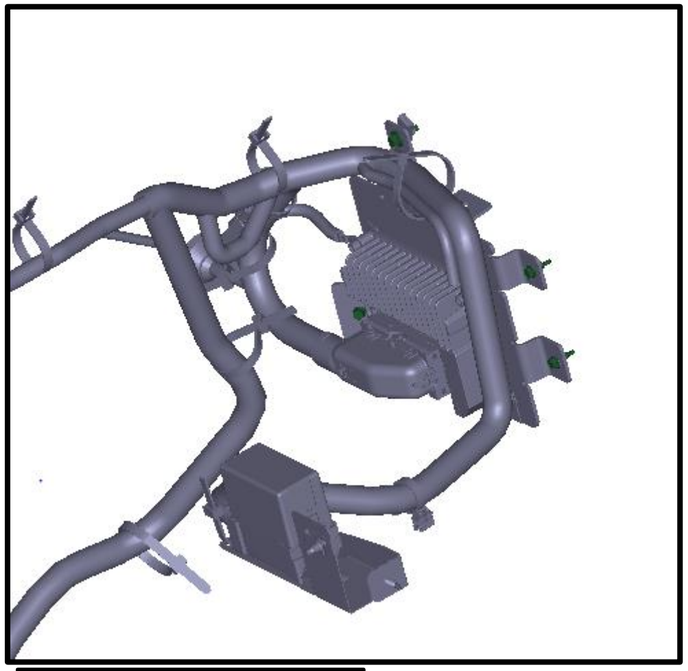
INSTALL SRM, FUSE BOX AND TIE STRAP TO OEM HARNESS



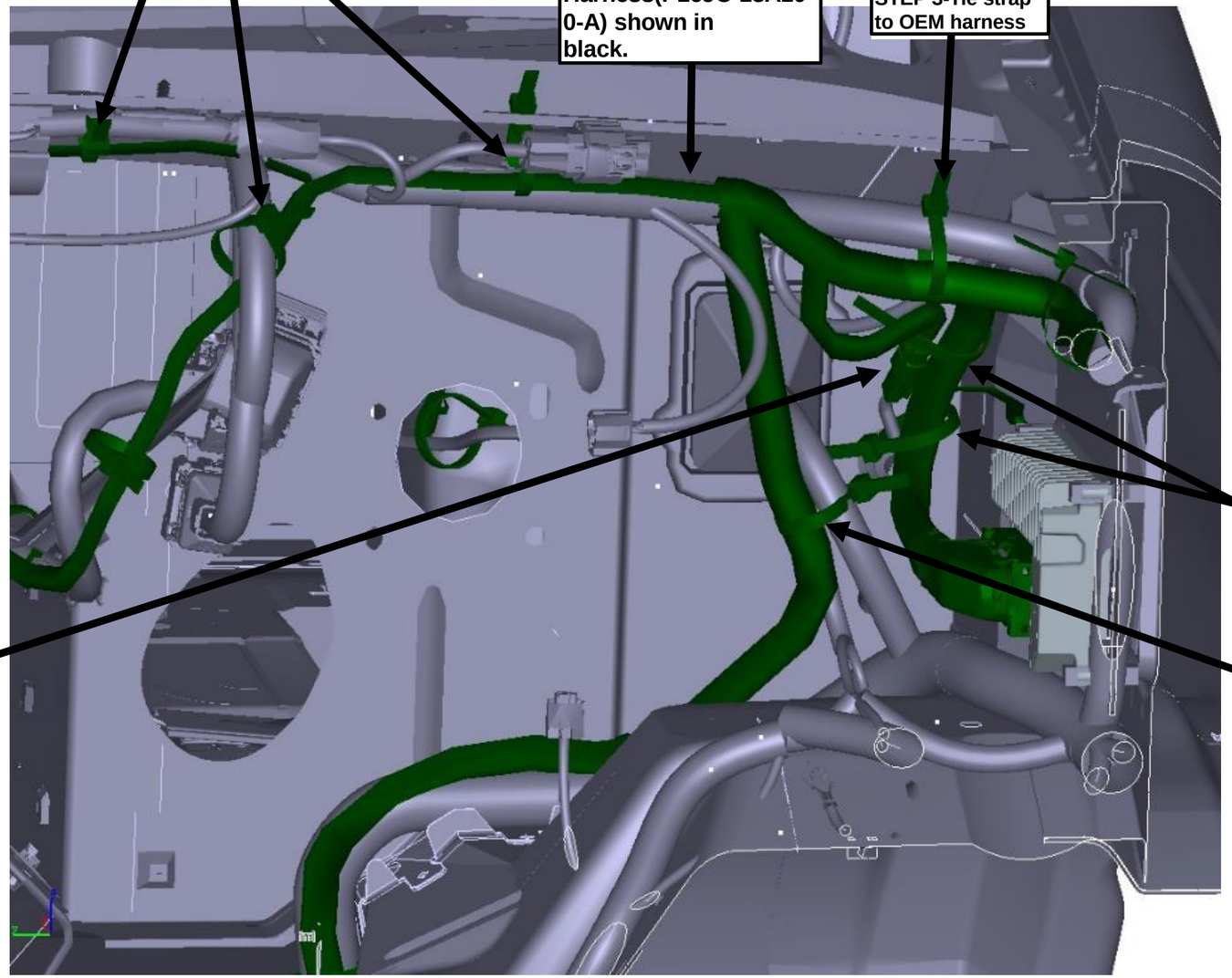


Front of the vehicle

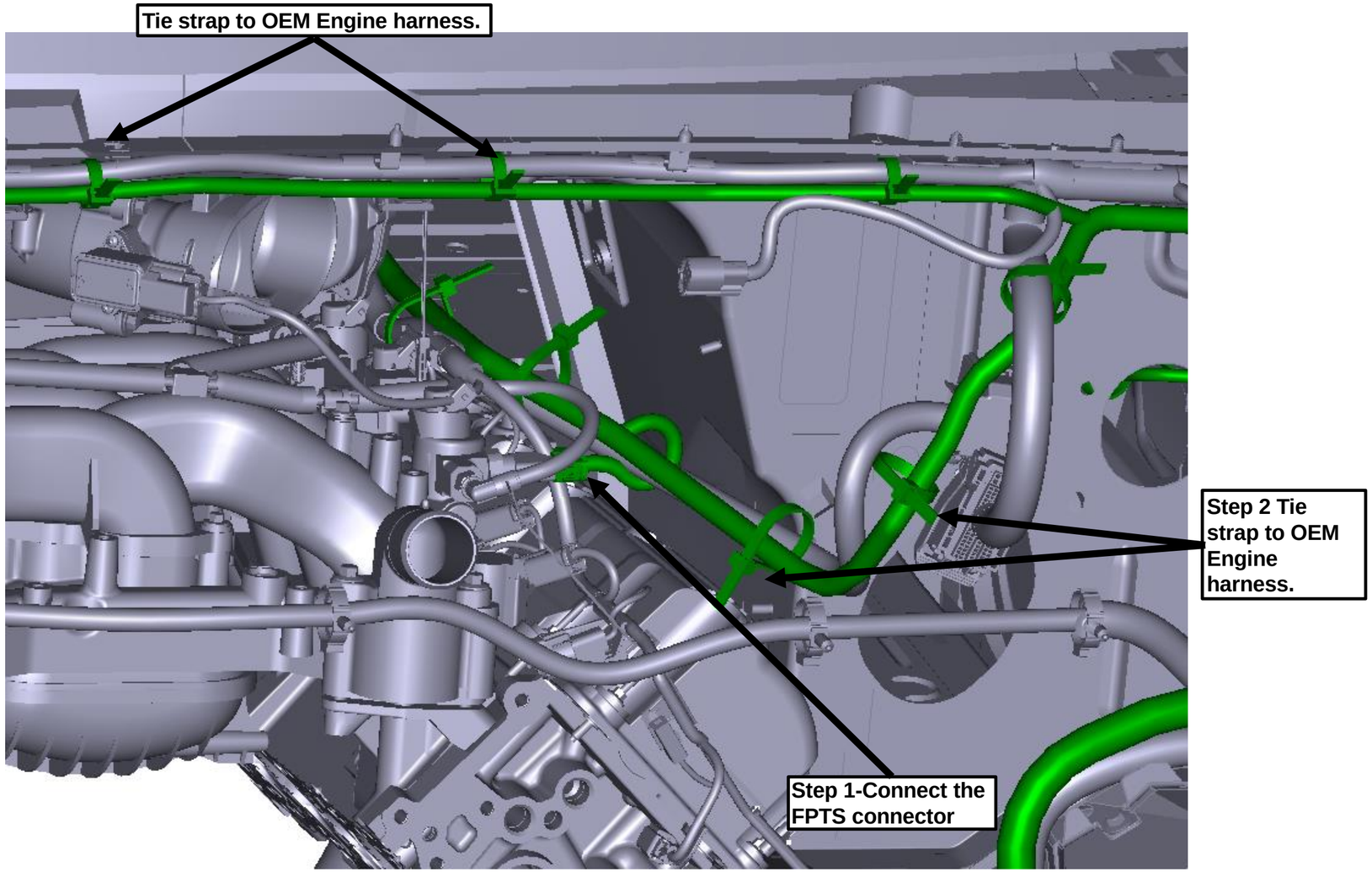
CONNECT CAN HARNESS AND RETAIN ROUSH HARNESS (BLACK) TO OEM HARNESS



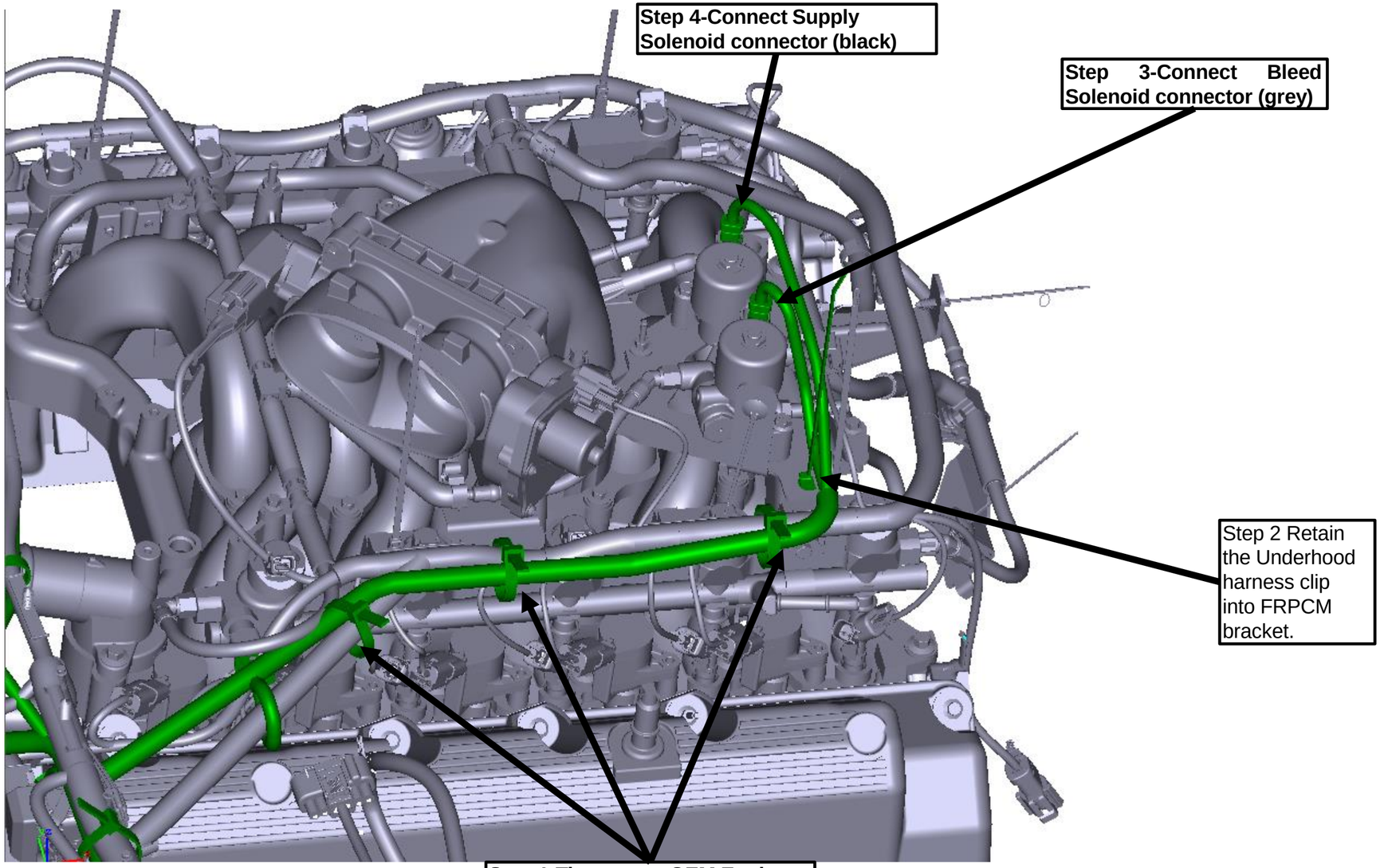
View of RCT harness only



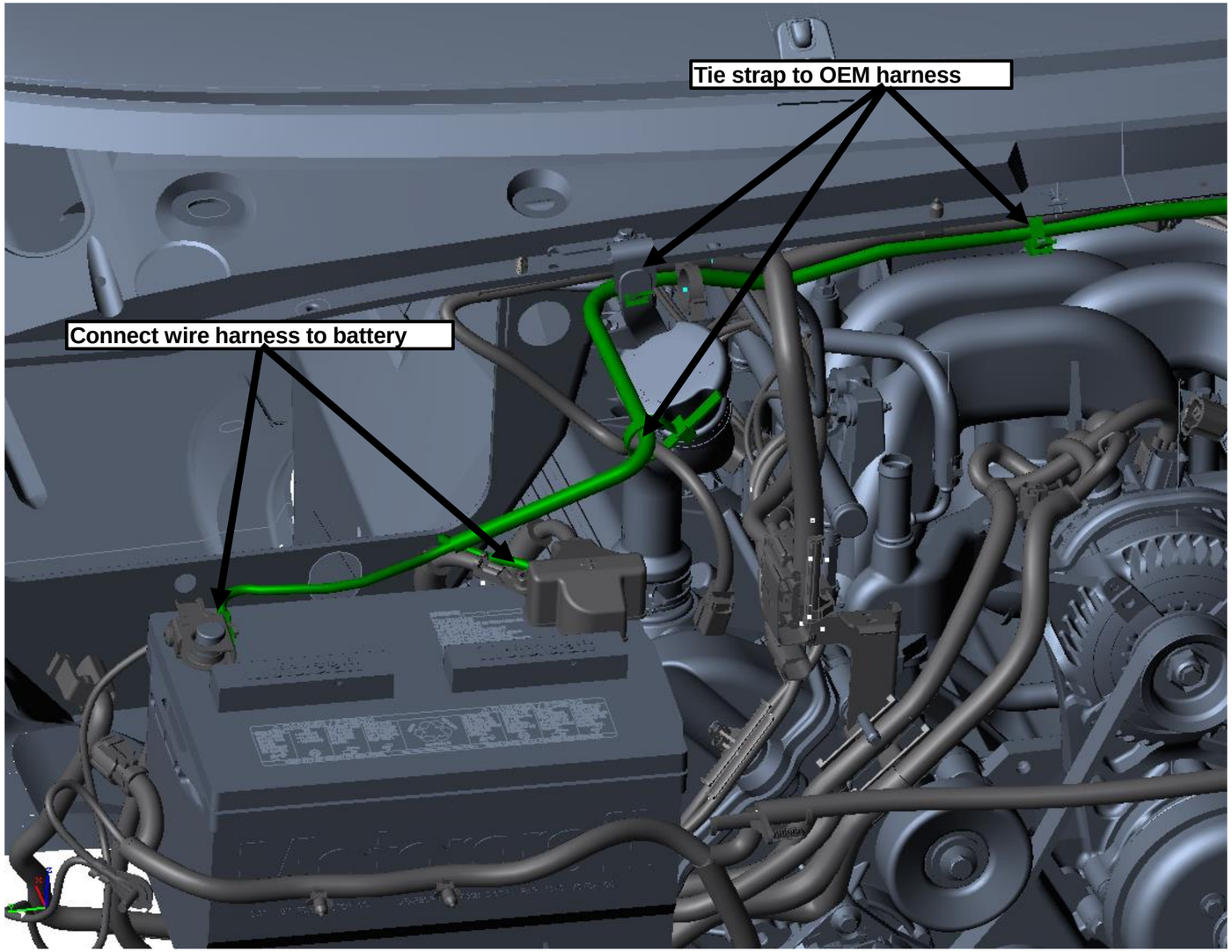
CONNECT FPTS CONNECTOR AND RETAIN ROUSH WIRING HARNESS TO OEM HARNESS



CONNECT ROUSH HARNESS TO FRPCM AND ZIP TIE ROUSH HARNESS TO OEM HARNESS

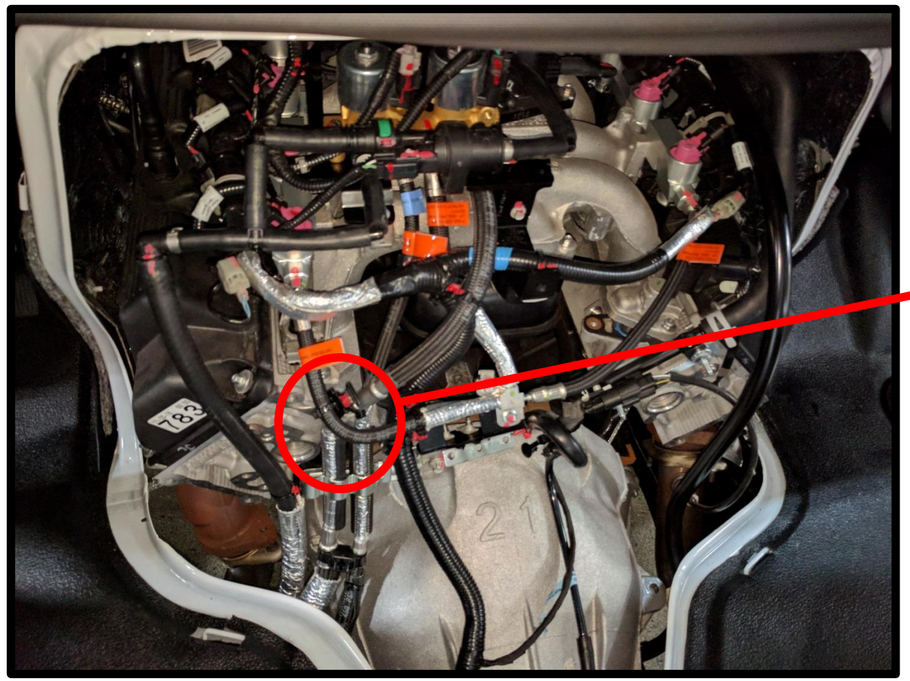


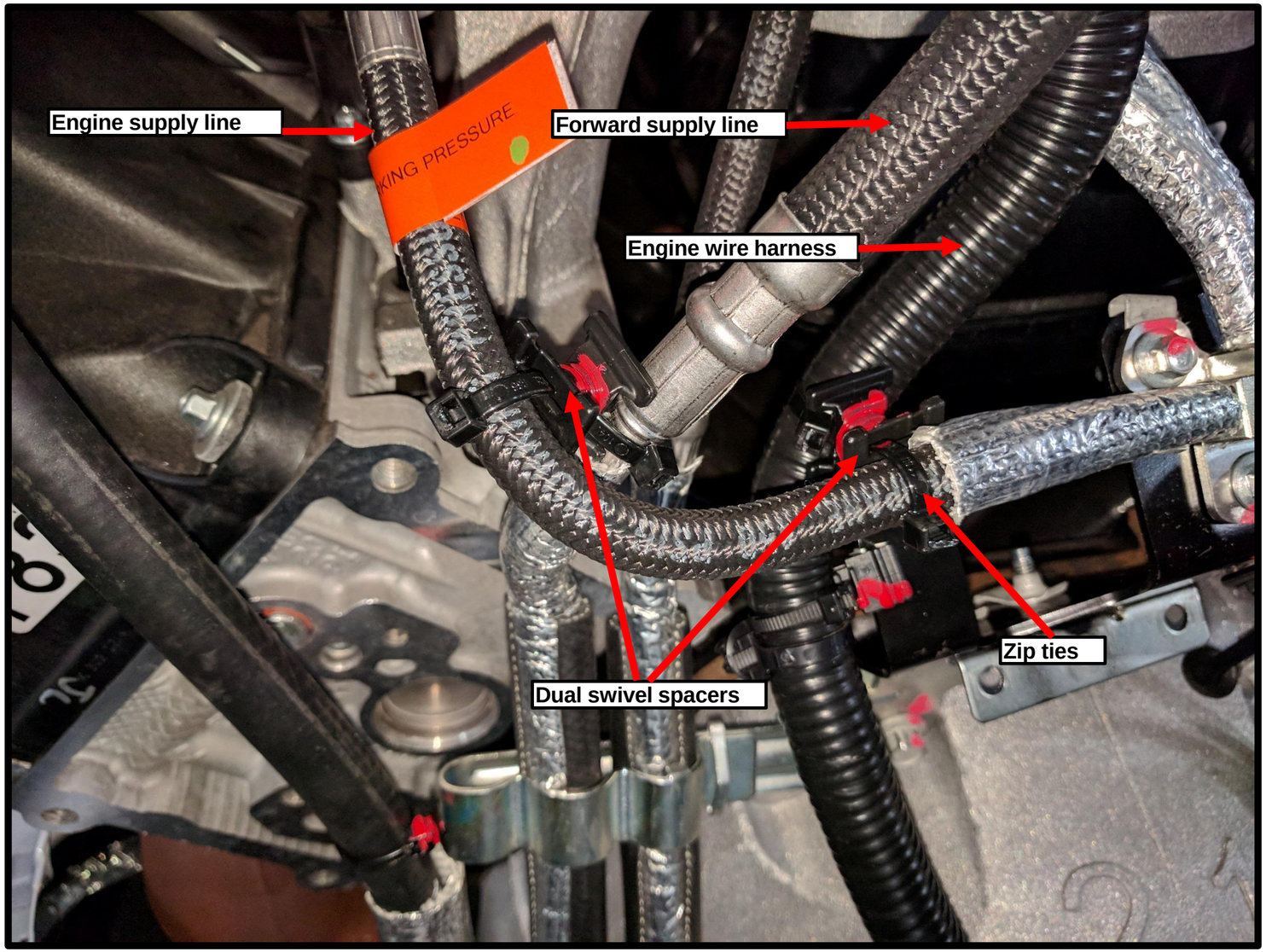
CONNECT ROUSH HARNESS TO BATTERY



ADD DUAL SWIVEL SPACERS TO ENGINE KIT

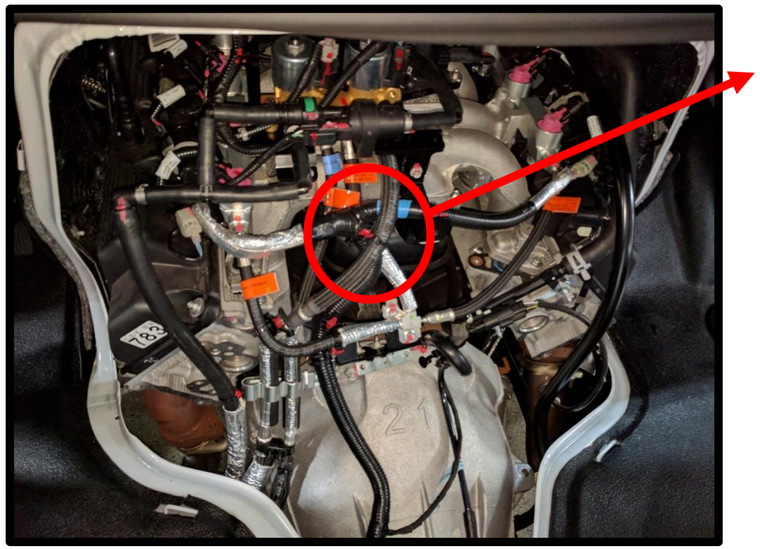
1. Add qty 2 dual swivel spacers (151-06500) with qty 4 zip ties (20-403-0003) to retain the LH engine supply line away from forward supply line and the engine wire harness as shown

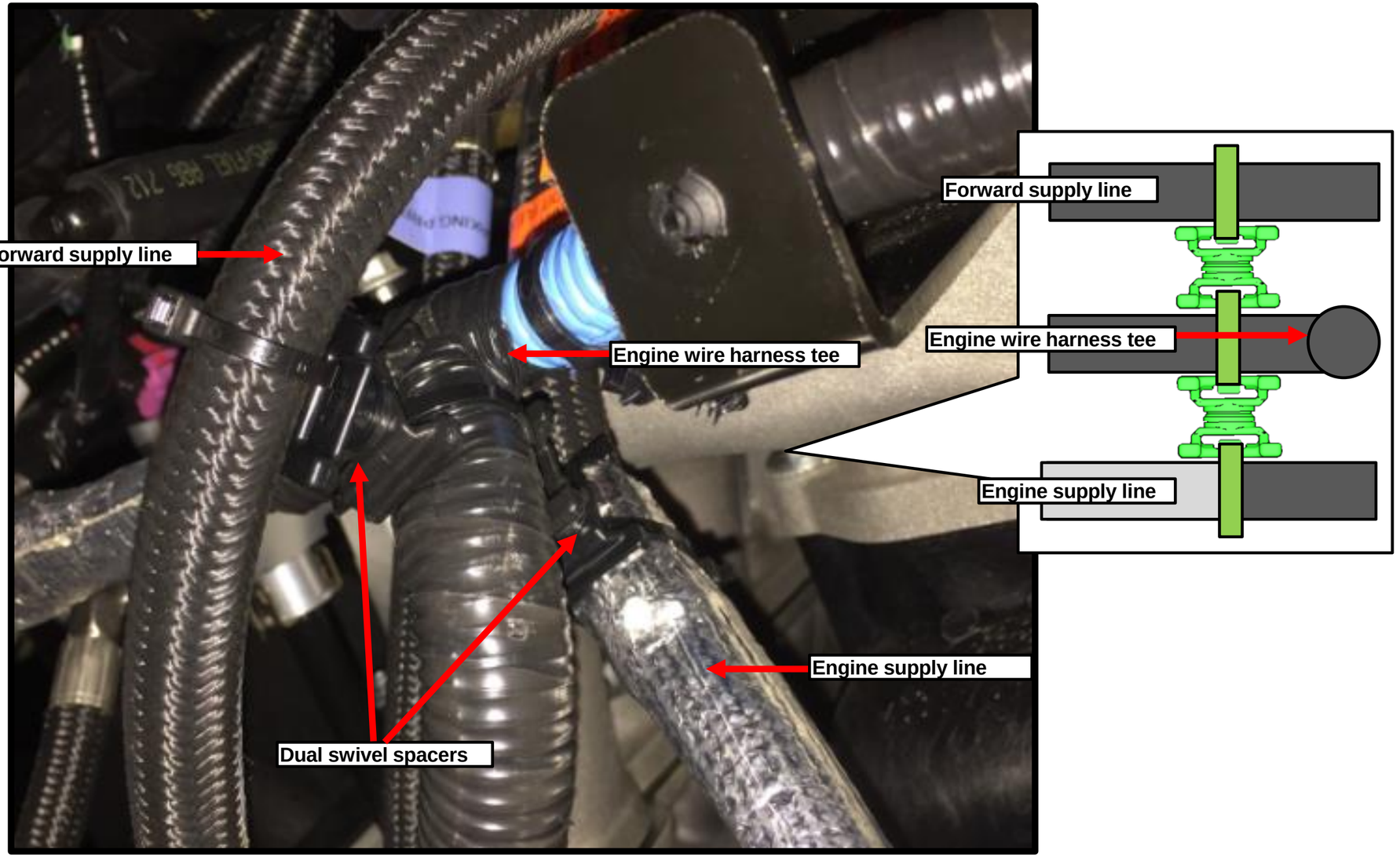




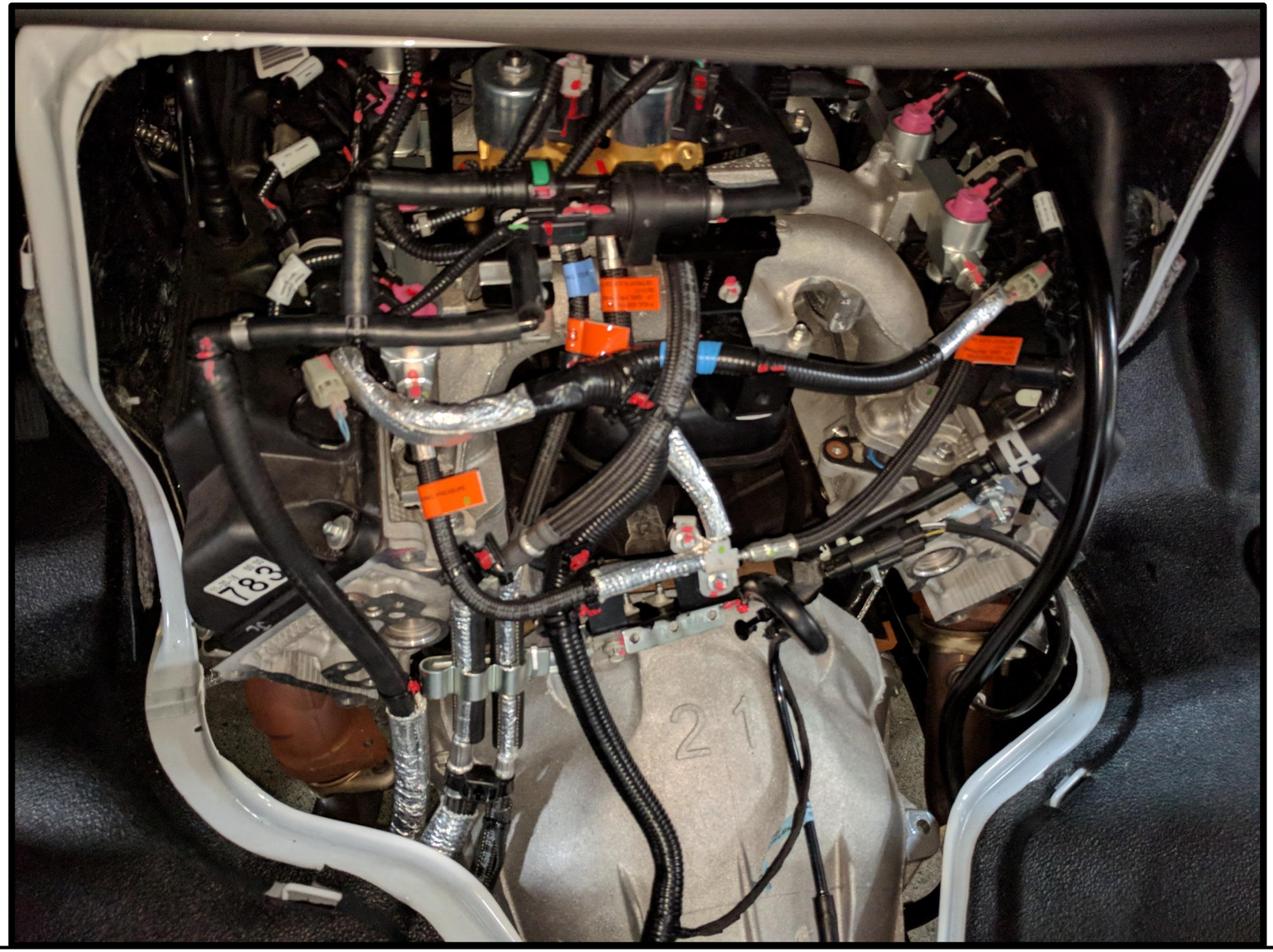
ADD DUAL SWIVEL SPACERS TO ENGINE KIT

1. Add qty 2 dual swivel spacers (151-06500) with qty 3 zip ties (20-403-0003) to retain the forward supply line away from the engine wire harness tee as well as the engine supply line away from the engine wire harness as shown.
2. Make sure to use 1 zip tie around the engine wire harness that will retain both dual swivel spacers on either side of the harness



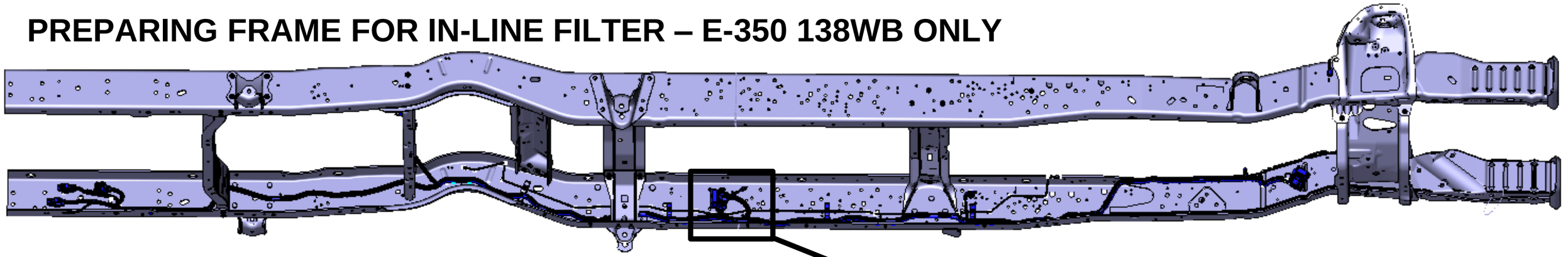


VERIFY THE ORIENTATION/POSITION OF THE ENGKIT HARDWARE

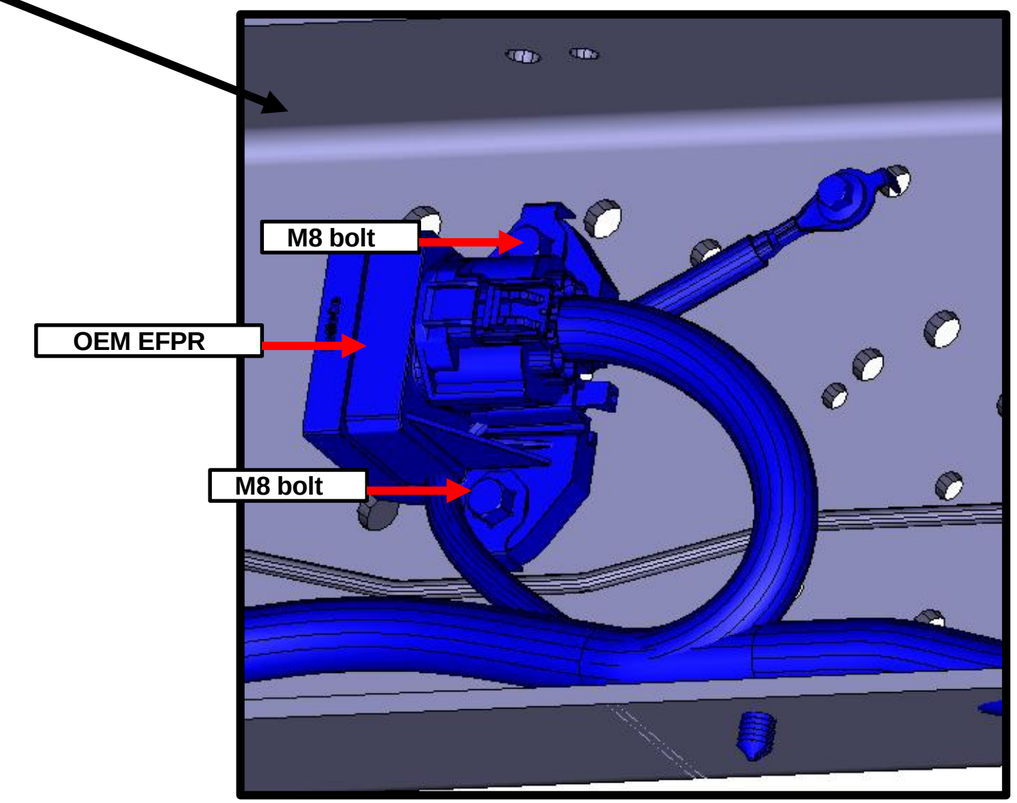


DISCARD REUSE NEW

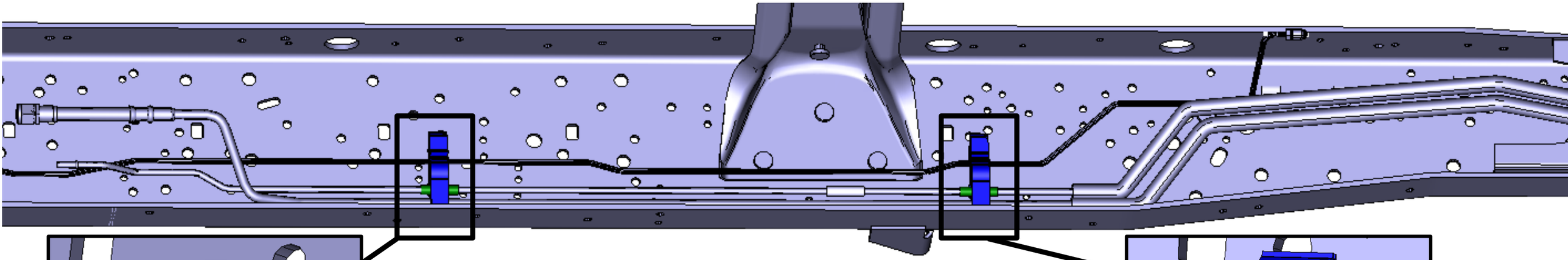
PREPARING FRAME FOR IN-LINE FILTER – E-350 138WB ONLY



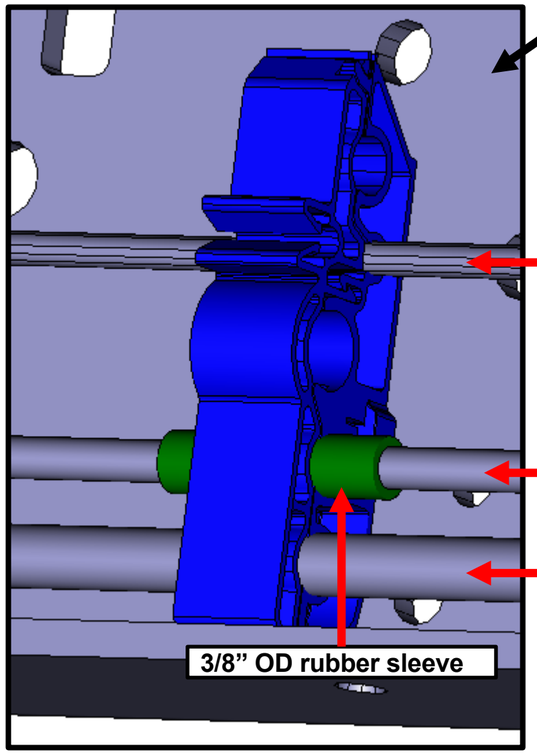
1. Remove qty (2) M8 bolts and nuts that retain the OEM EFPR to the frame. Retain for later.
2. Move EFPR off of frame to make room for forward fuel lines

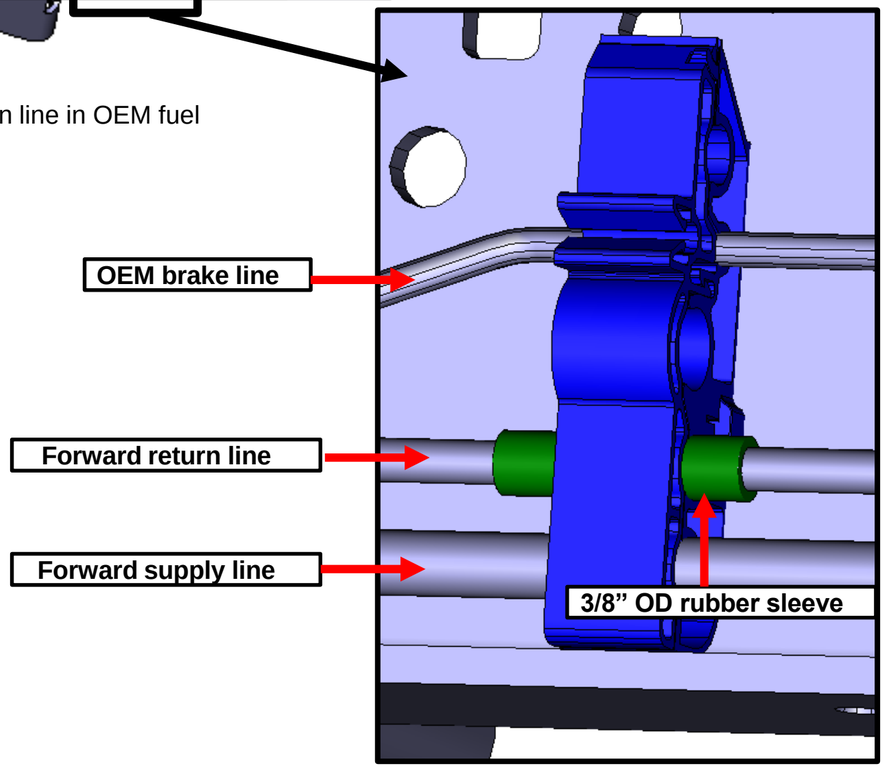


INSTALL RUBBER SLEEVES ON FORWARD LINES – E-350 138WB ONLY



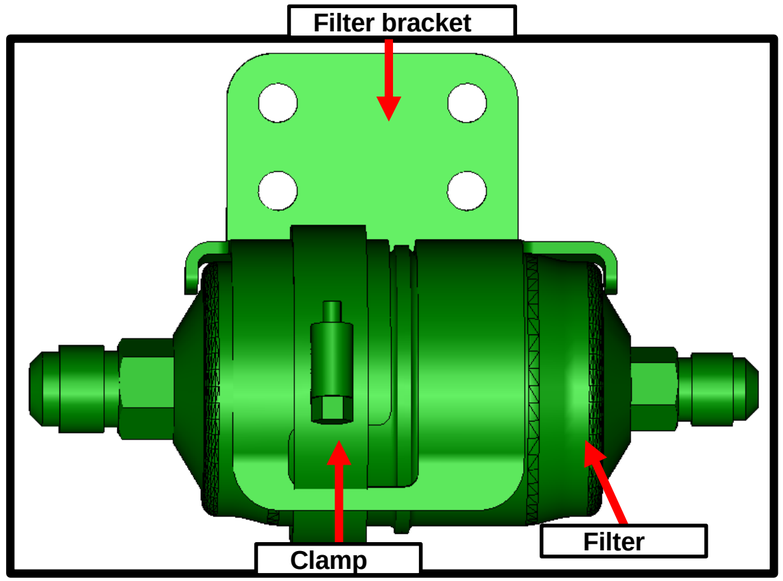
1. Install qty (2) 3/8” OD rubber sleeves (P07L3-9C328-B) on forward return line in OEM fuel line clips as shown
2. Close OEM fuel line clips

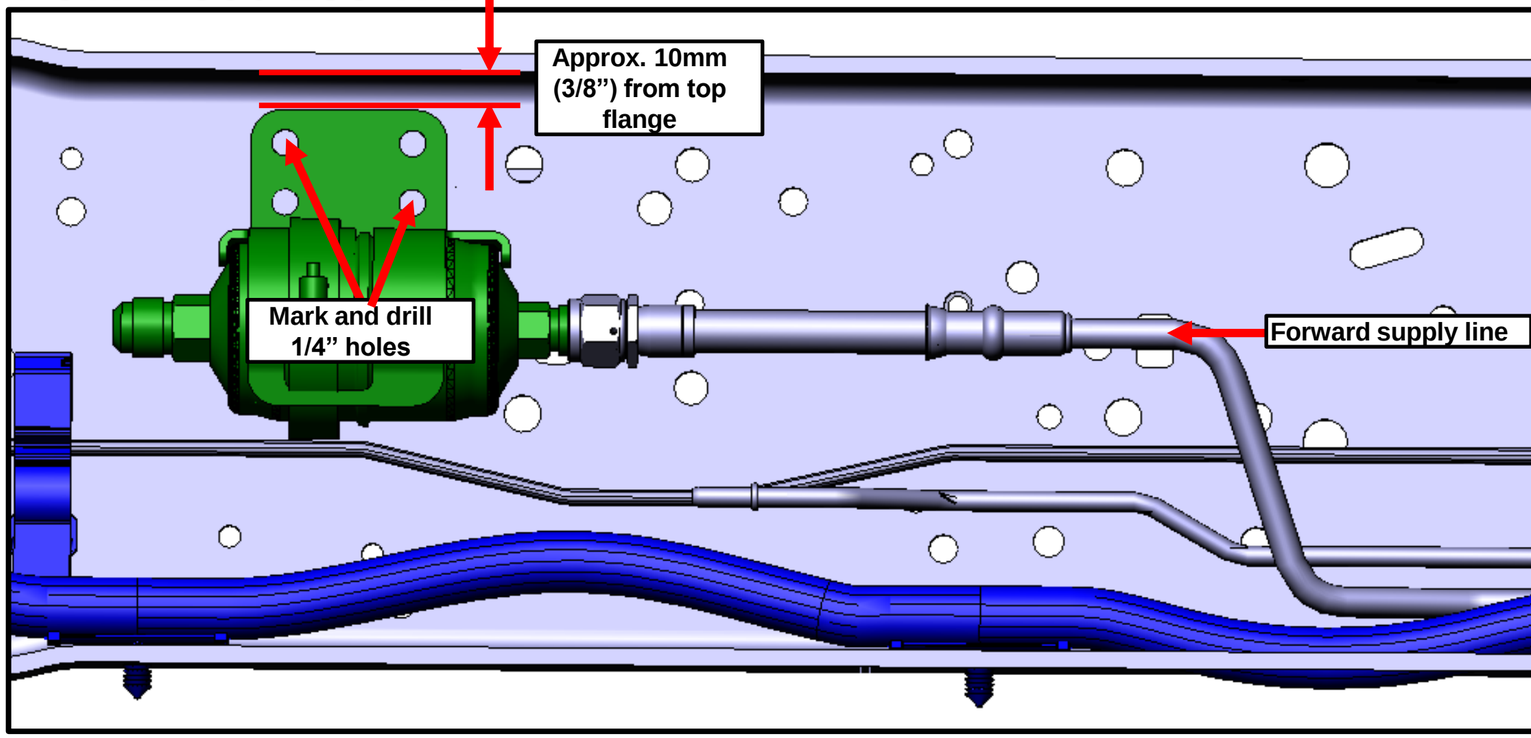


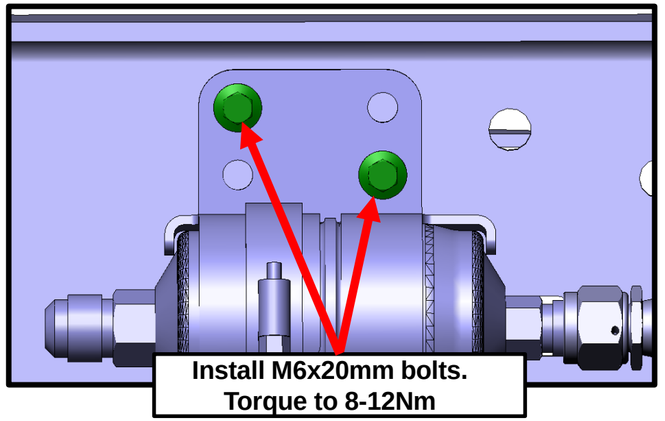


LOCATION OF IN-LINE FILTER BRACKET FOR E-350 138 WB

1. Install in-line filter (P-10S200-A) into filter bracket (P17JC-10S220-A) using clamp (6P-300-52).
2. Loosely attach filter to forward supply line (P17JC10S110-A) and use filter bracket as template to mark holes to be drilled. Ensure bracket is approx. 10mm from frame top flange.
3. Once filter is in position, mark two holes to be drilled on frame as shown
4. Drill 1/4” holes
5. Take qty (2) M6x20mm bolts and qty (2) M6 nuts (11-278-0274) and bolt filter bracket to frame. Torque to 8-12Nm

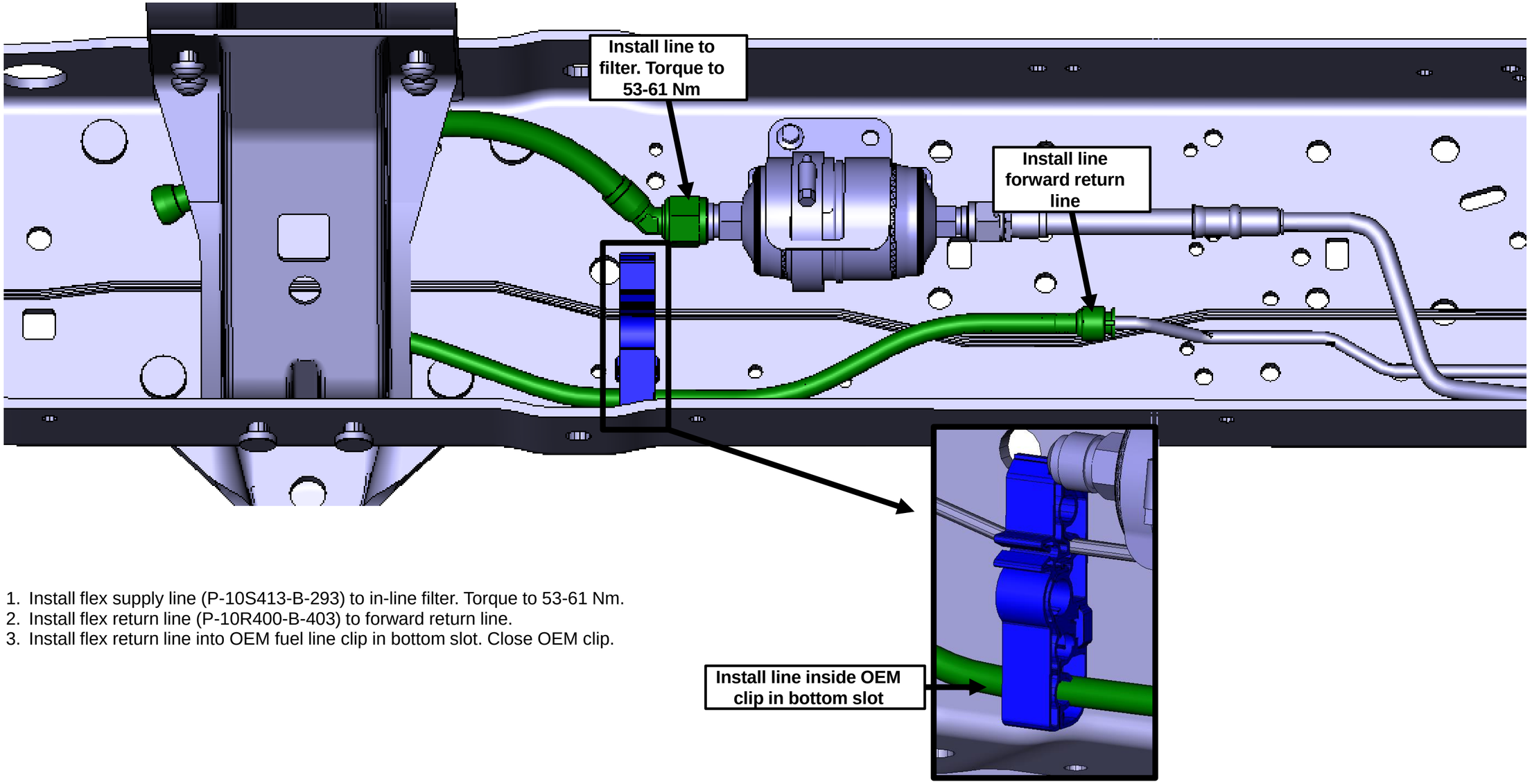






DISCARD REUSE NEW

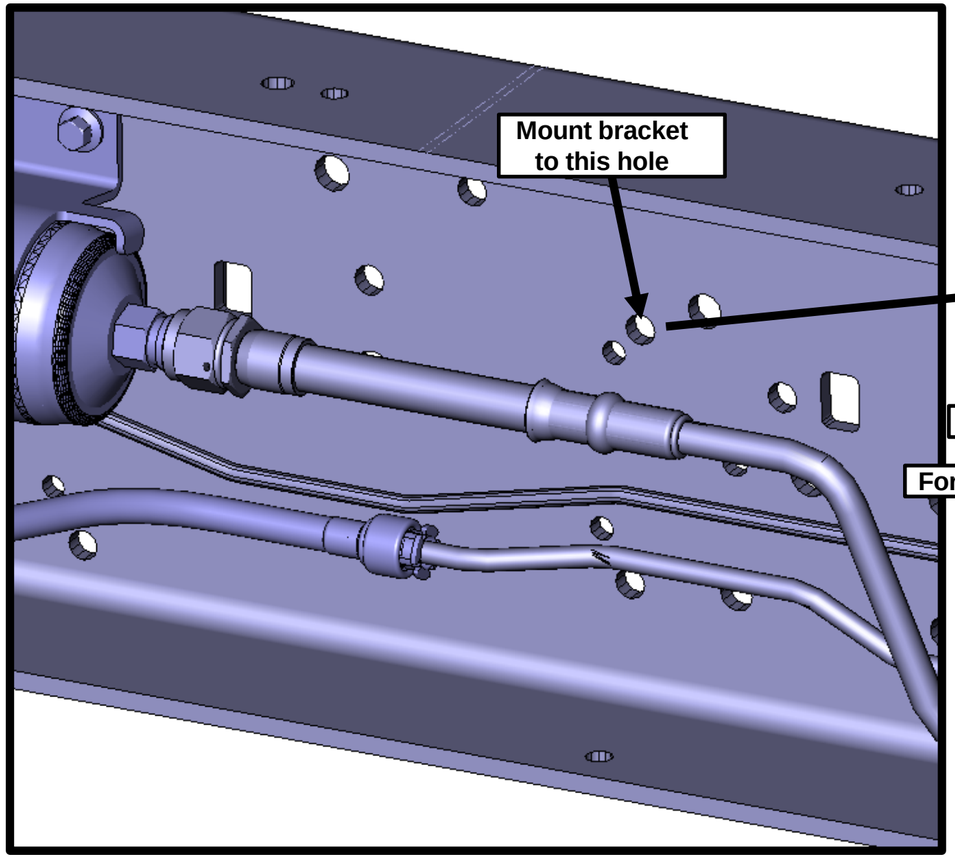
INSTALL THE INTERMEDIATE LINES FOR E-350 138WB

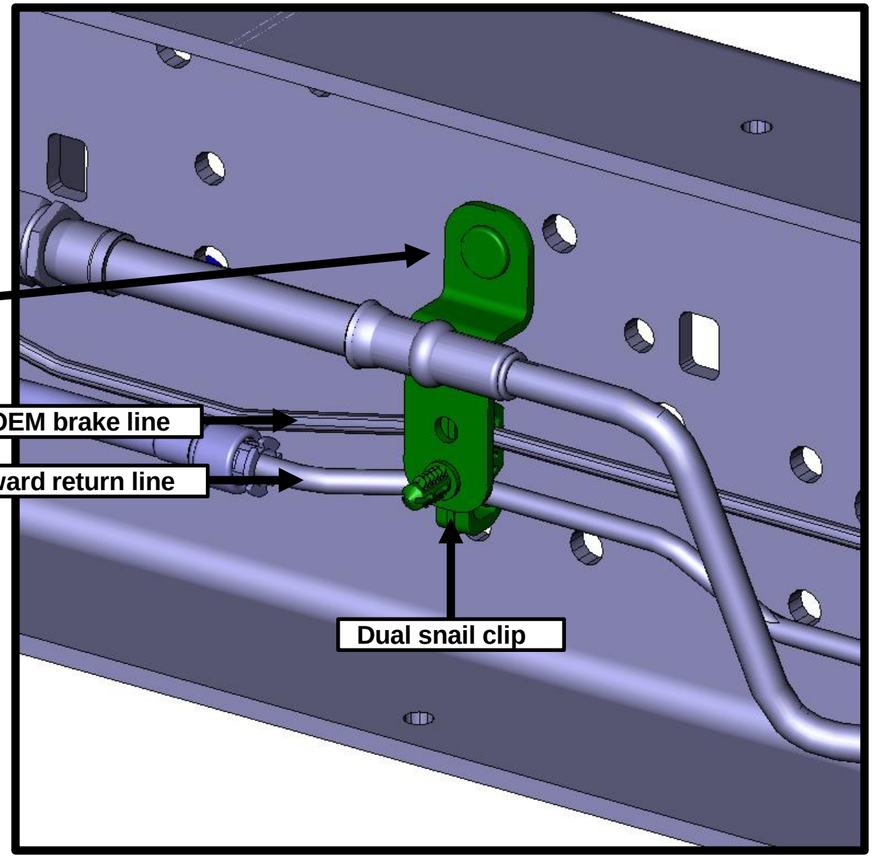


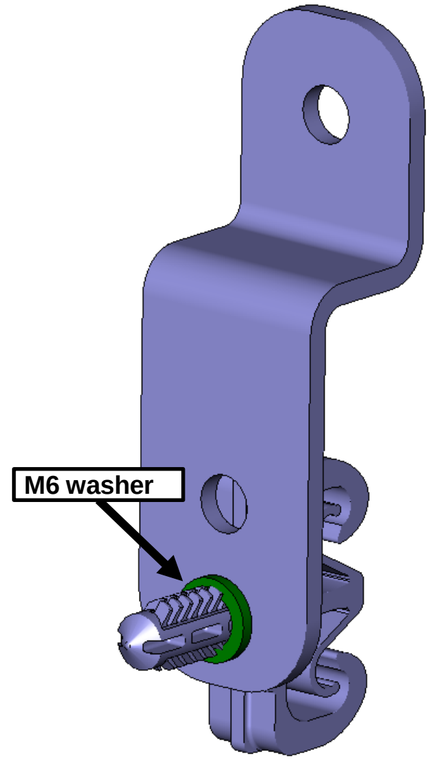
1. Install flex supply line (P-10S413-B-293) to in-line filter. Torque to 53-61 Nm.
2. Install flex return line (P-10R400-B-403) to forward return line.
3. Install flex return line into OEM fuel line clip in bottom slot. Close OEM clip.

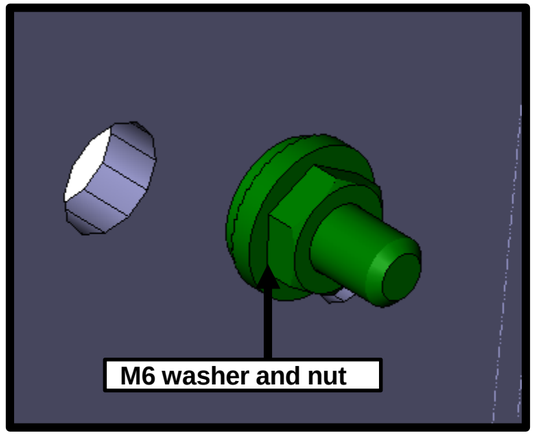
INSTALL THE INTERMEDIATE LINES FOR E-350 138WB

1. Take bracket (P16JC-10F100-C) and insert a dual snail clip (15-004175) into hole on bracket. Retain dual snail clip using M6 washer (11-452-0206) on back of bracket as shown.
2. Insert stud end of bracket into hole on frame and clip both the OEM brake line and forward return line into dual snail clip as shown.
3. Install M6 washer (MW6360000A40000) and M6 nut (11-278-0274) onto stud. Torque to 8-12 Nm.

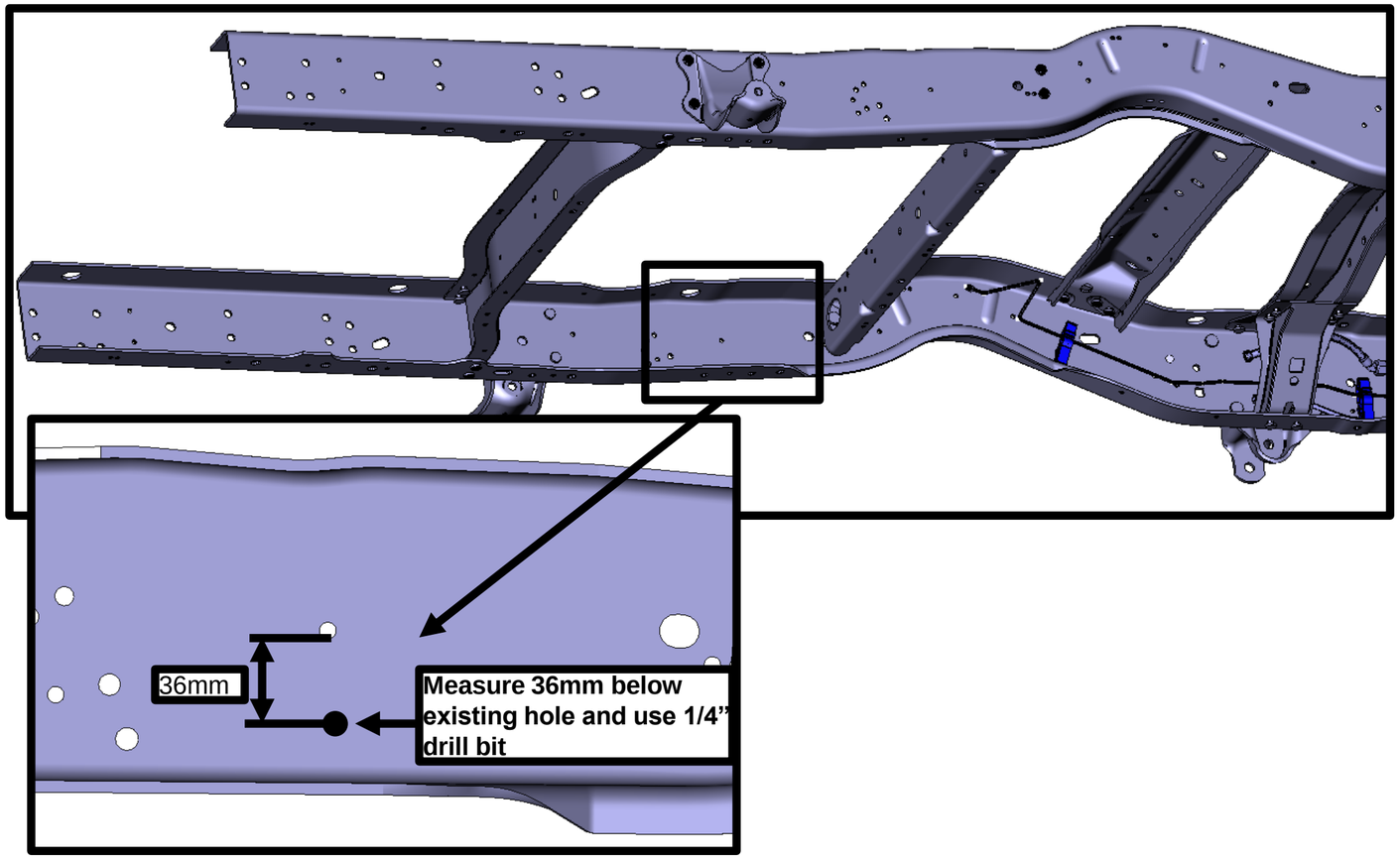


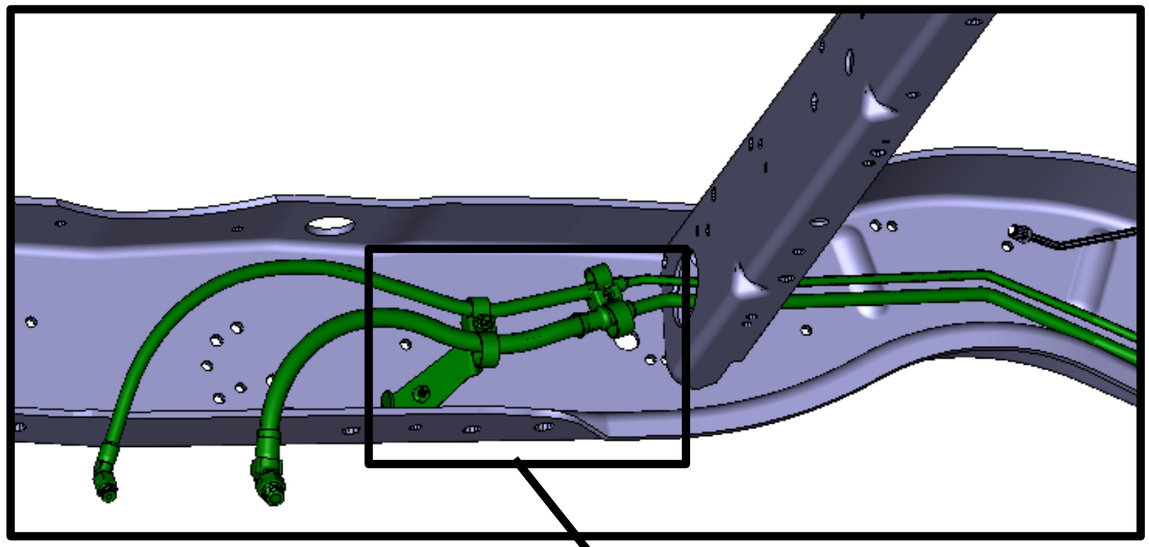


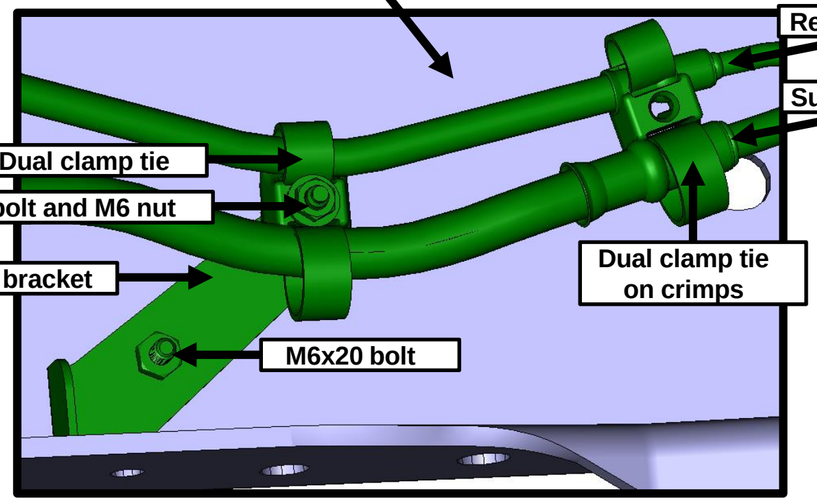




INSTALL THE REAR FUEL LINES FOR E-350 138WB (STANDARD TANK)

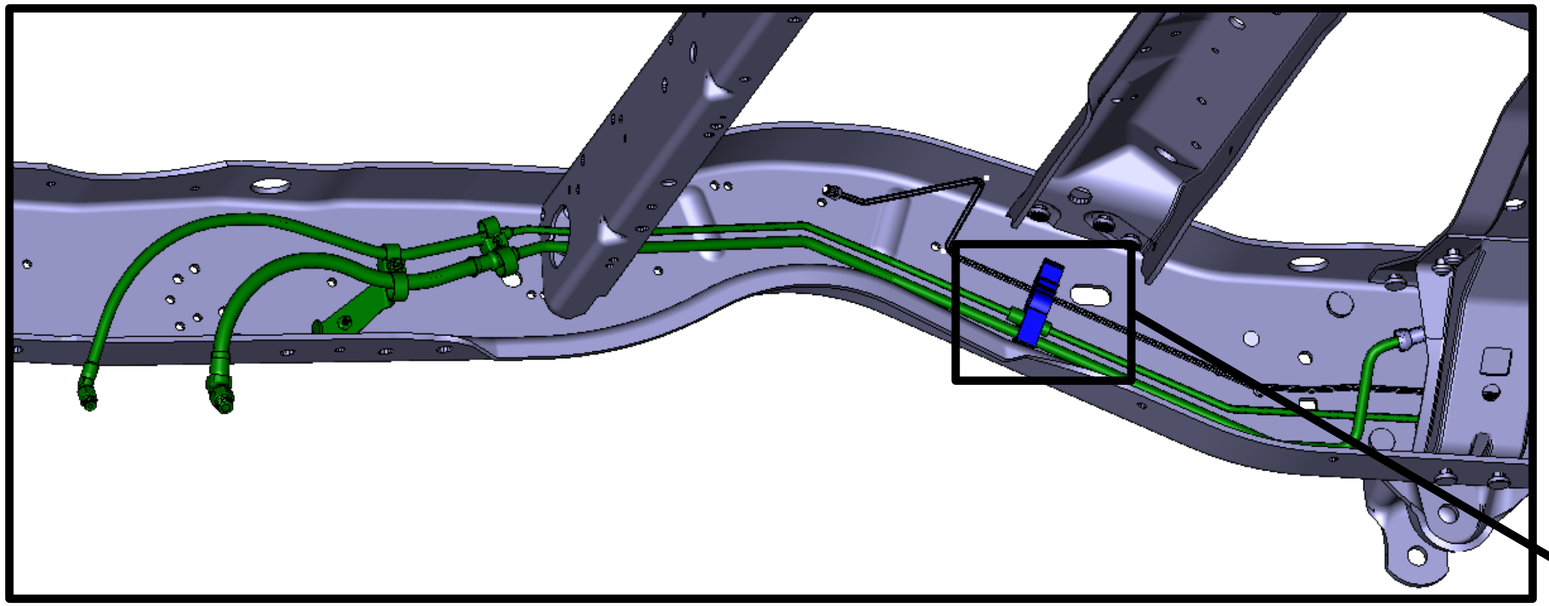


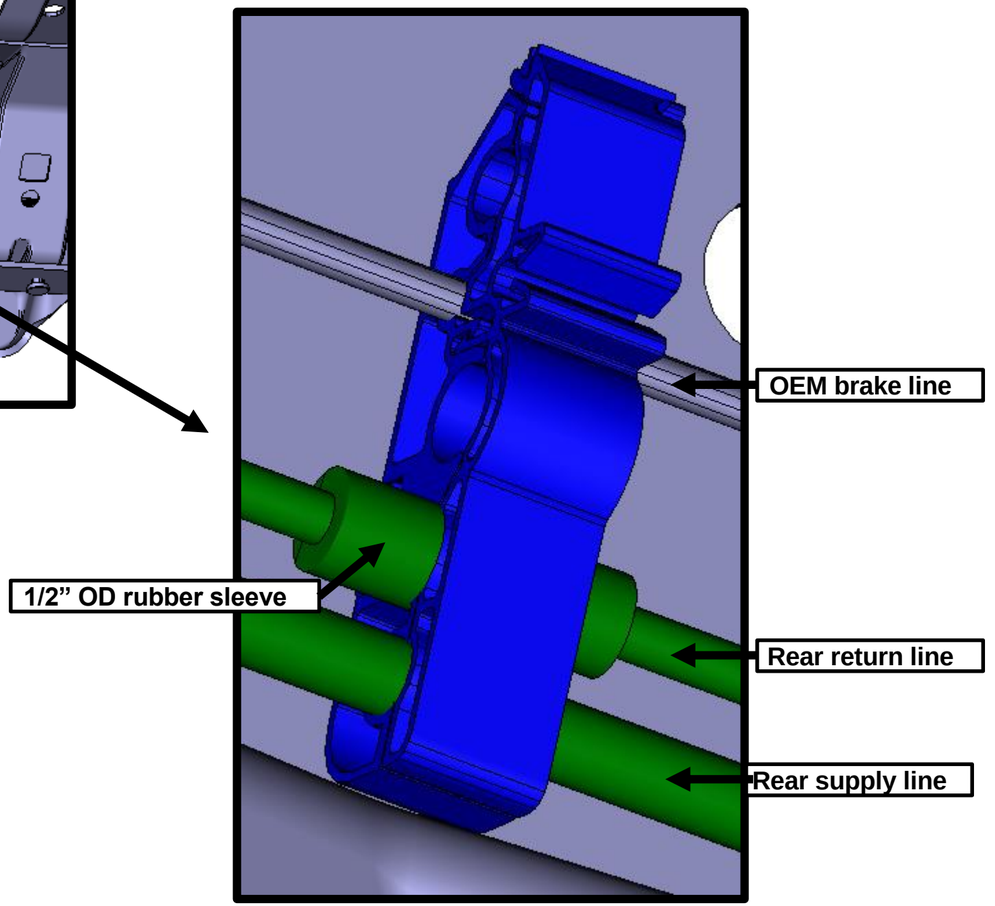




1. Locate area on frame as shown and measure 36mm below edge of existing hole in frame. Drill 1/4" hole.
2. Install fuel line bracket (P11JC-10F001-A) in orientation as shown to frame using M6x20mm bolt (98093A440). Torque to 8-12 Nm.
3. Install qty (2) dual clamp ties (20-403-0004) to fuel lines loosely, both on flex lines.
4. Connect the front end of the rear fuel supply line (P16JC-10S130-A) to the intermediate supply line (P-10S410-A-293).
5. Connect the front end of the rear return line (P16JC-10R130-A) to the intermediate return line (P-10R400-B-451)
6. Route fuel lines through hole in crossmember and retain the fuel lines to the fuel line bracket using dual clamp tie and M6x35mm bolt and M6 nut (11-278-0274)
7. Tighten 2nd dual clamp tie over fuel line crimps as shown

INSTALL RUBBER SLEEVE ON REAR LINES – E-350 138WB (AND EXTENDED WB)

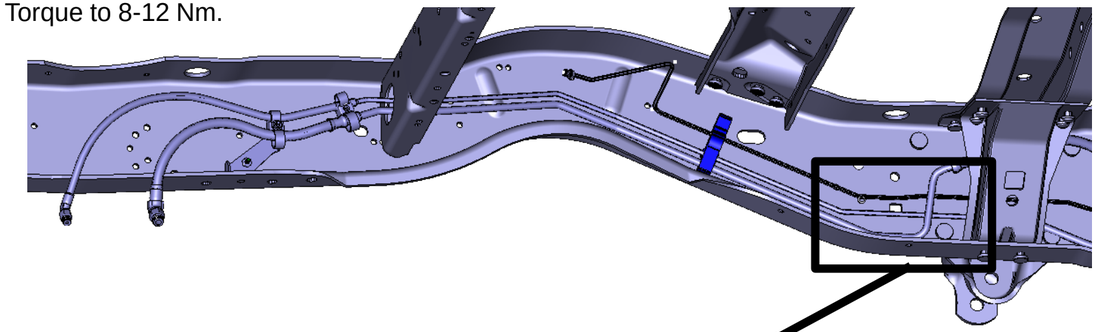


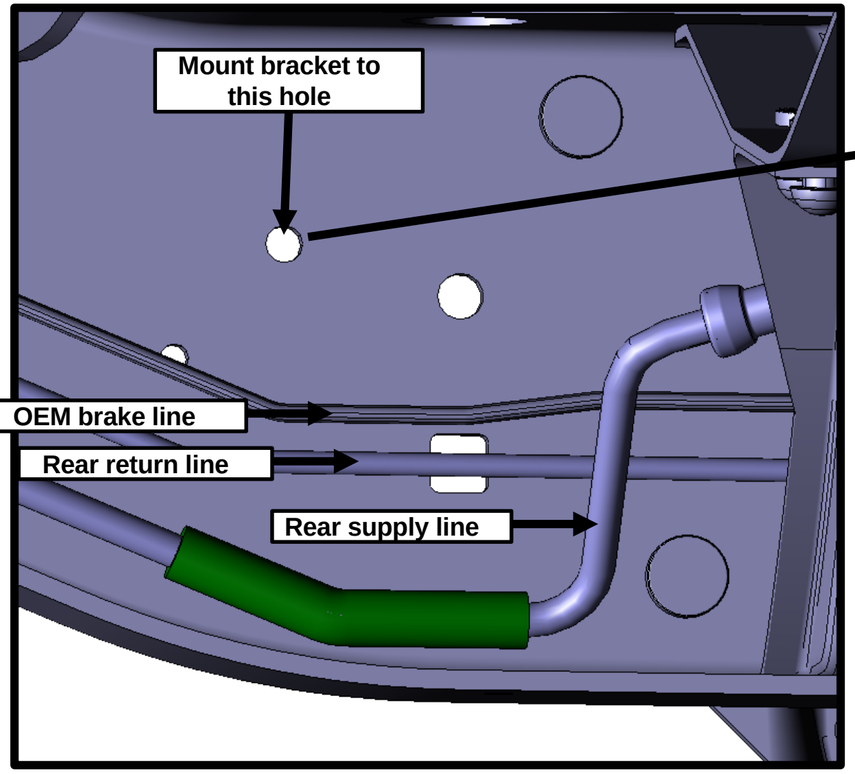


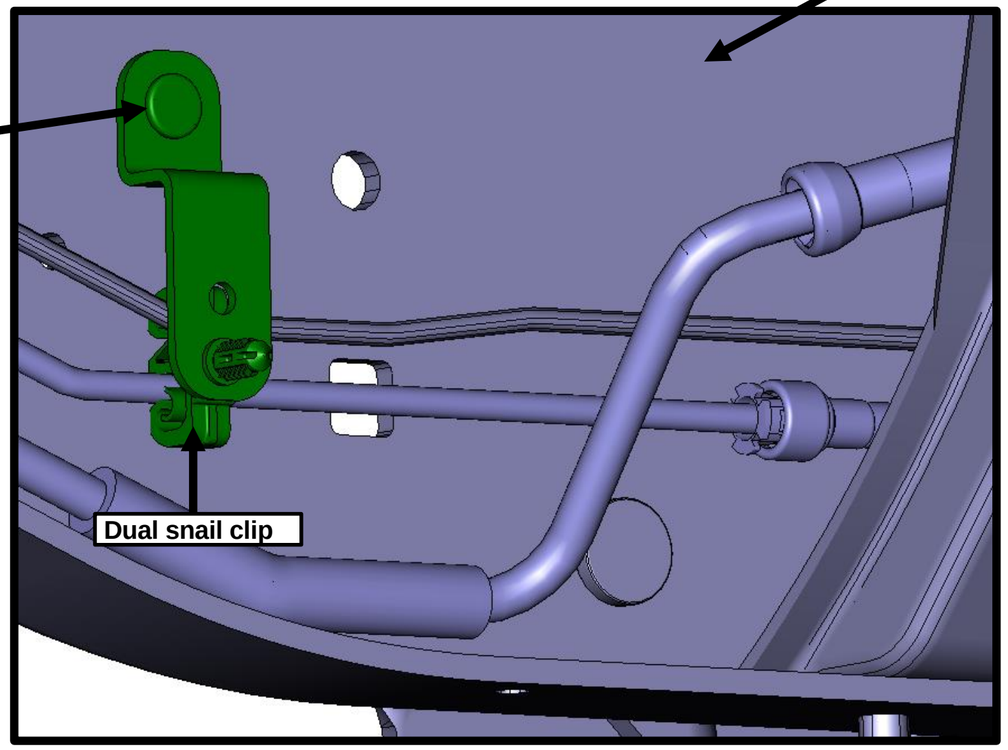
1. Install qty (1) ½” OD rubber sleeves (P07L3-9C328-A) on rear return line in OEM fuel line clip as shown
2. Close OEM fuel line clip

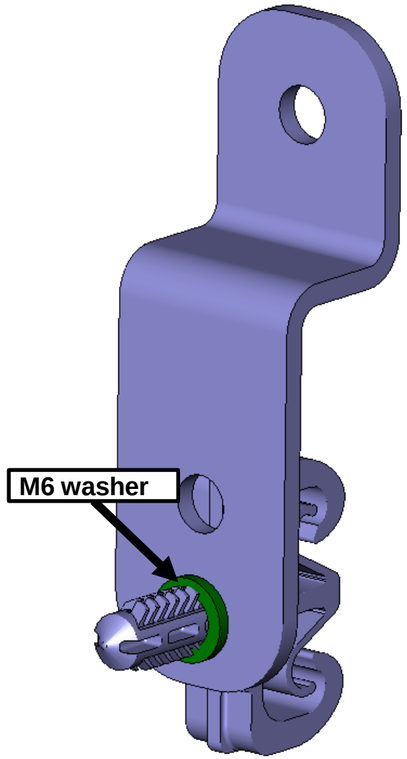
INSTALL FUEL LINE BRACKET ON REAR LINES – E-350 138WB ONLY

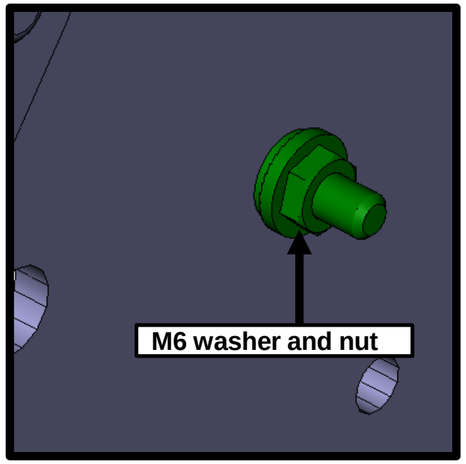
1. Install 4” long rubber sleeve (PBC2-9C328-A) and install it on rear supply line as shown
2. Take bracket (P16JC-10F100-C) and insert a dual snail clip (15-004175) into hole on bracket. Retain dual snail clip using M6 washer (11-452-0206) on back of bracket as shown.
3. Insert stud end of bracket into hole on frame and clip both the OEM brake line and rear return line into dual snail clip as shown.
4. Install M6 washer (MW6360000A40000) and M6 nut (11-278-0274) onto stud. Torque to 8-12 Nm.





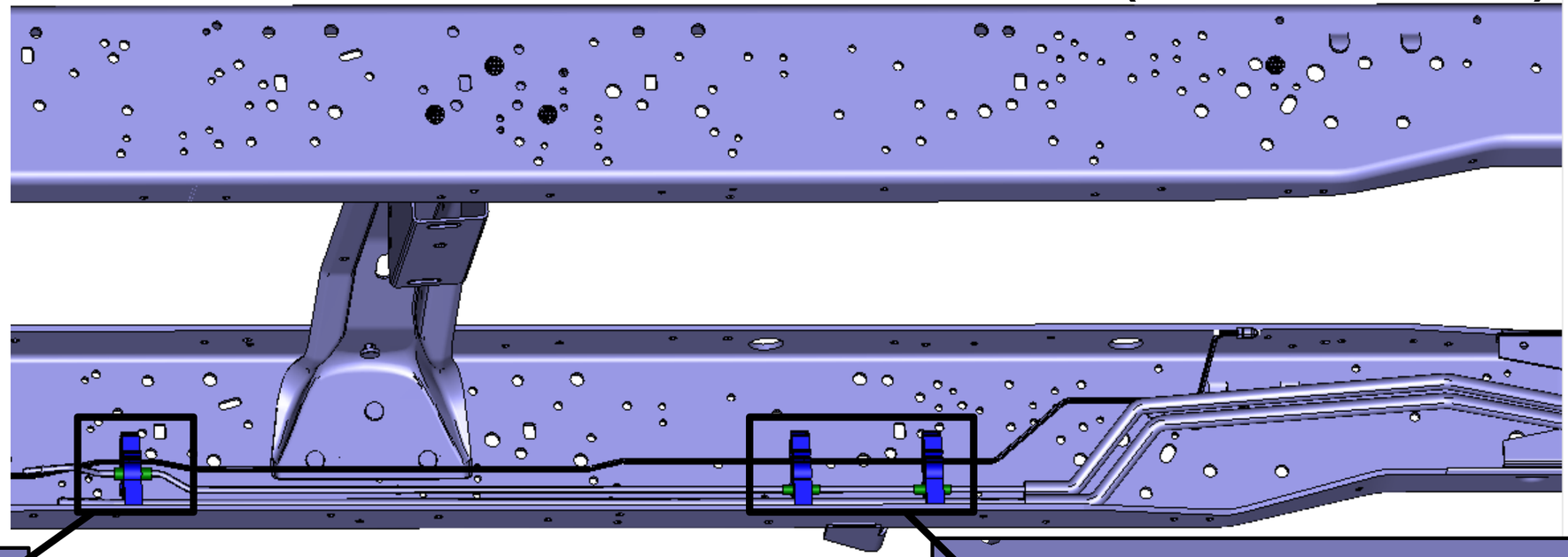


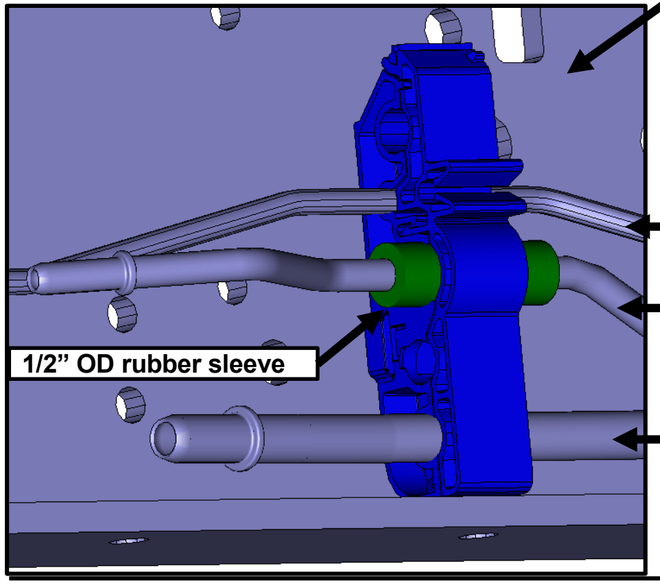




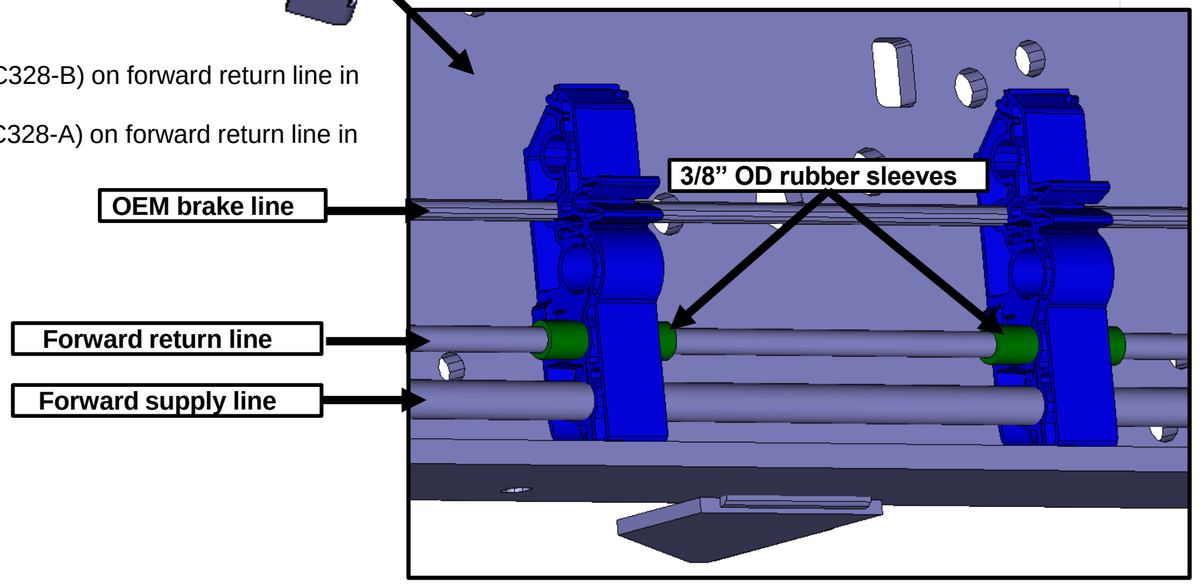
DISCARD REUSE NEW

INSTALL RUBBER SLEEVES ON FORWARD LINES – E-450 158WB AND 176WB ONLY (AND EXTENDED WB)





1. Install qty (1) 3/8” OD rubber sleeve (P07L3-9C328-B) on forward return line in OEM fuel line clip as shown
2. Install qty (2) ½” OD rubber sleeves (P07L3-9C328-A) on forward return line in OEM fuel line clips as shown
3. Close OEM fuel line clips



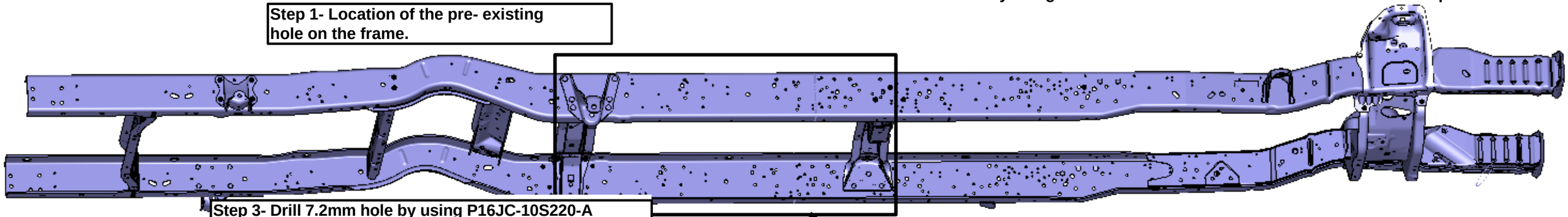
DISCARD REUSE NEW

LOCATION OF IN-LINE FILTER BRACKET FOR E-450 158 WB

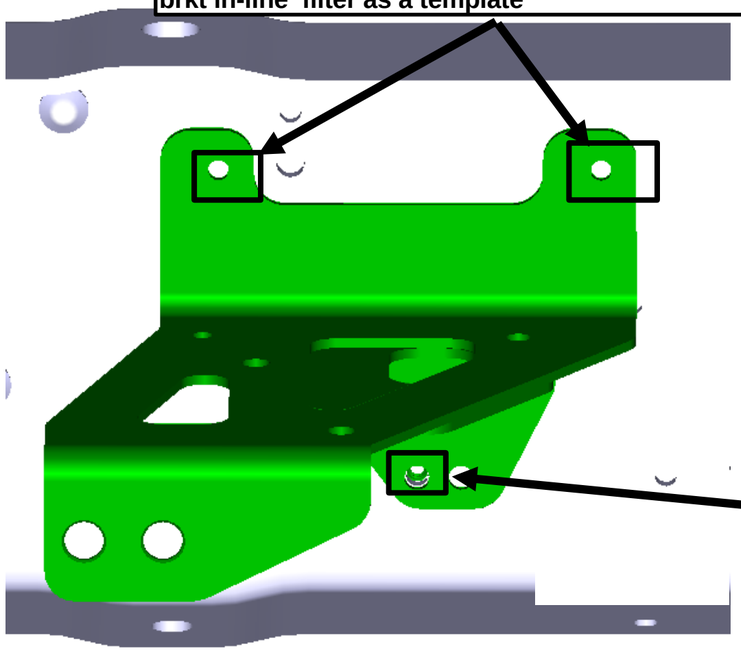
1. Locate the pre- existing hole on the frame.
2. Align the bracket with the existing hole (diameter-7.2 mm) and make sure the bracket is in up straight position, then mark two holes using a punch.
3. Drill 6mm hole by using P16JC-10S220-AA BRKT IN-LINE FILTER as a template

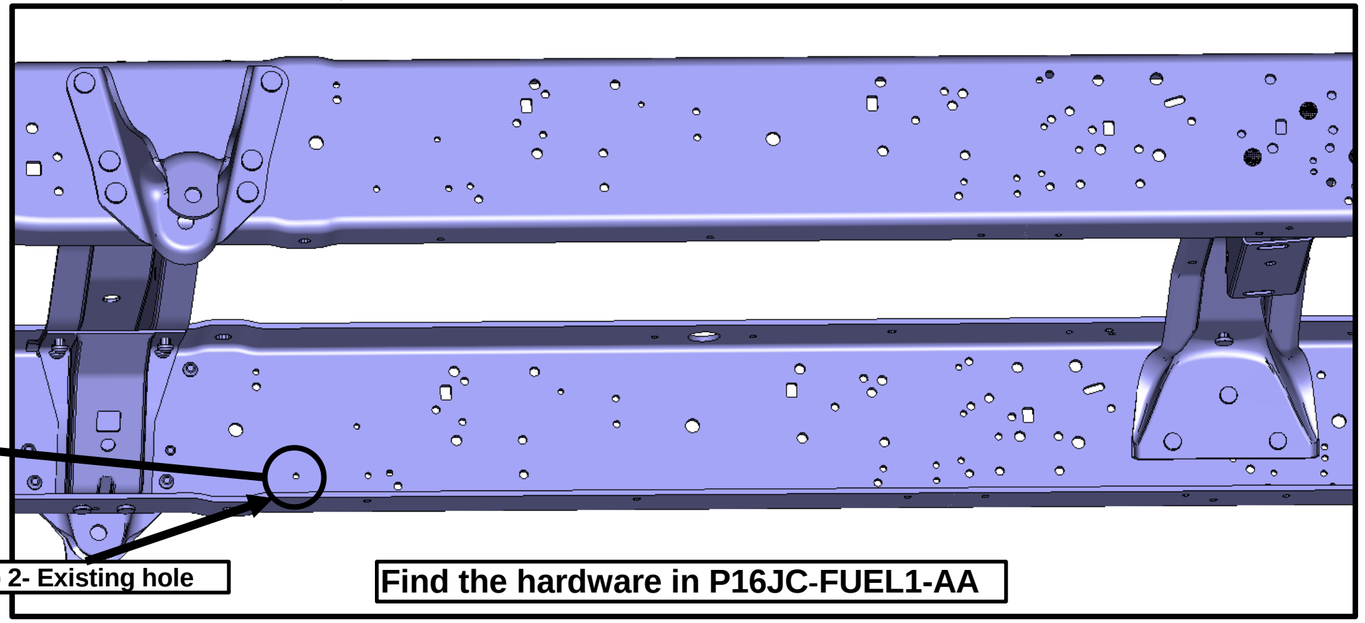
FRONT OF THE VEHICLE

Step 1- Location of the pre- existing hole on the frame.



Step 3- Drill 7.2mm hole by using P16JC-10S220-A brkt in-line filter as a template

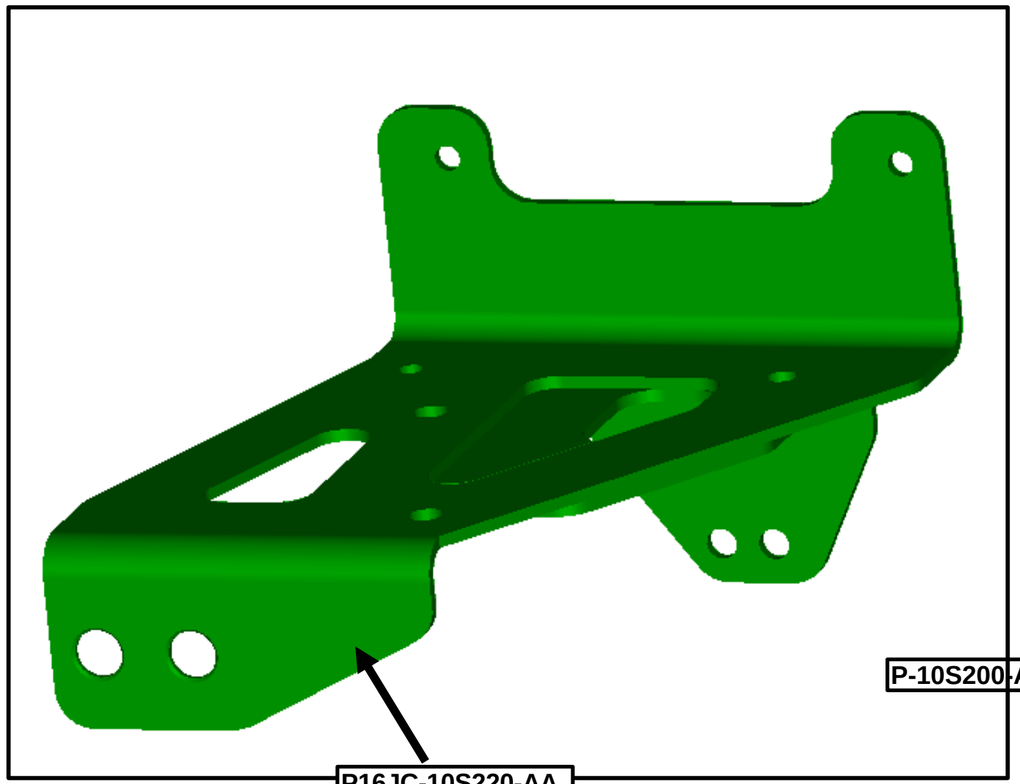




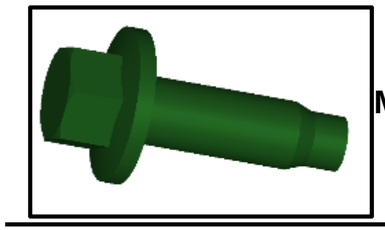
Step 2- Existing hole

Find the hardware in P16JC-FUEL1-AA

MOUNT THE IN-LINE FILTER TO THE IN-LINE BRACKET FOR E-450 158 WB

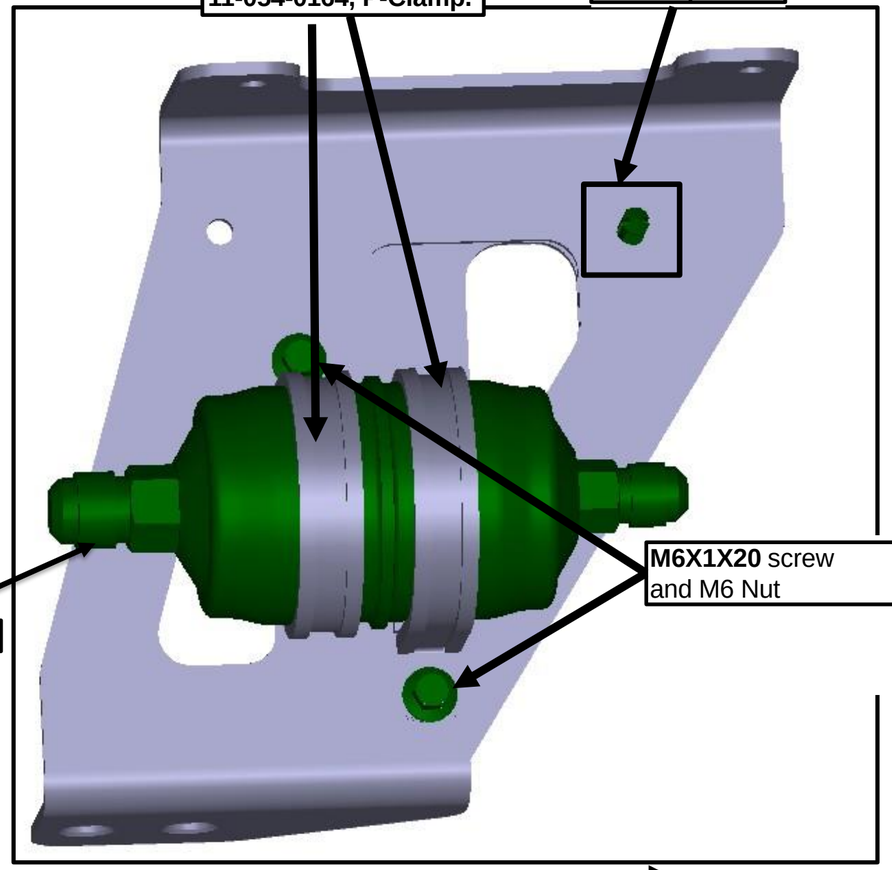


P16JC-10S220-AA
BRKT IN-LINE
FILTER.



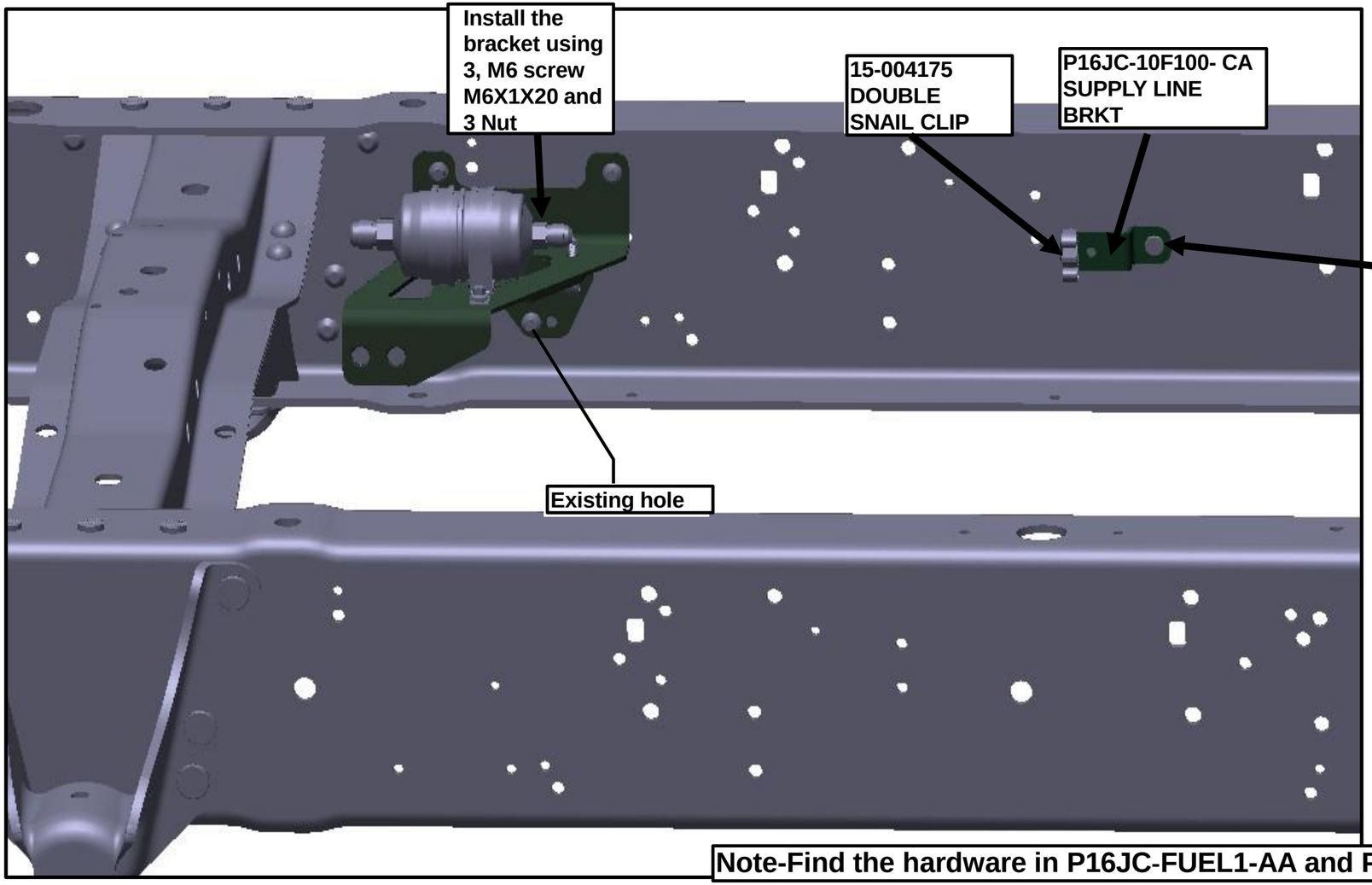
M6X1X20 screw

On Bench



Find the hardware in P16JC-FUEL1-AA

INSTALL THE IN-LINE FILTER BRACKET AND THE FUEL LINE BRACKET FOR E-450 158 WB



FRONT OF THE VEHICLE

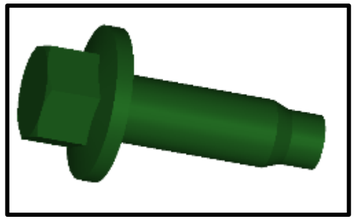
Retain the bracket using
M6 Weld Stud,
91100A150 M6 FLAT WASHER
90591A151 and M6-HEX-NUT

1.Install the In-fliter bracket with the M6 bolt and nut as shown.

2. Install the P16JC-10F100-CA SUPPLY LINE BRKT using existing hole

3. For longer Wheel base than 158 and 176, please use zip ties to hold the flex fuel lines every 8 inches.

M6X1X20 screw

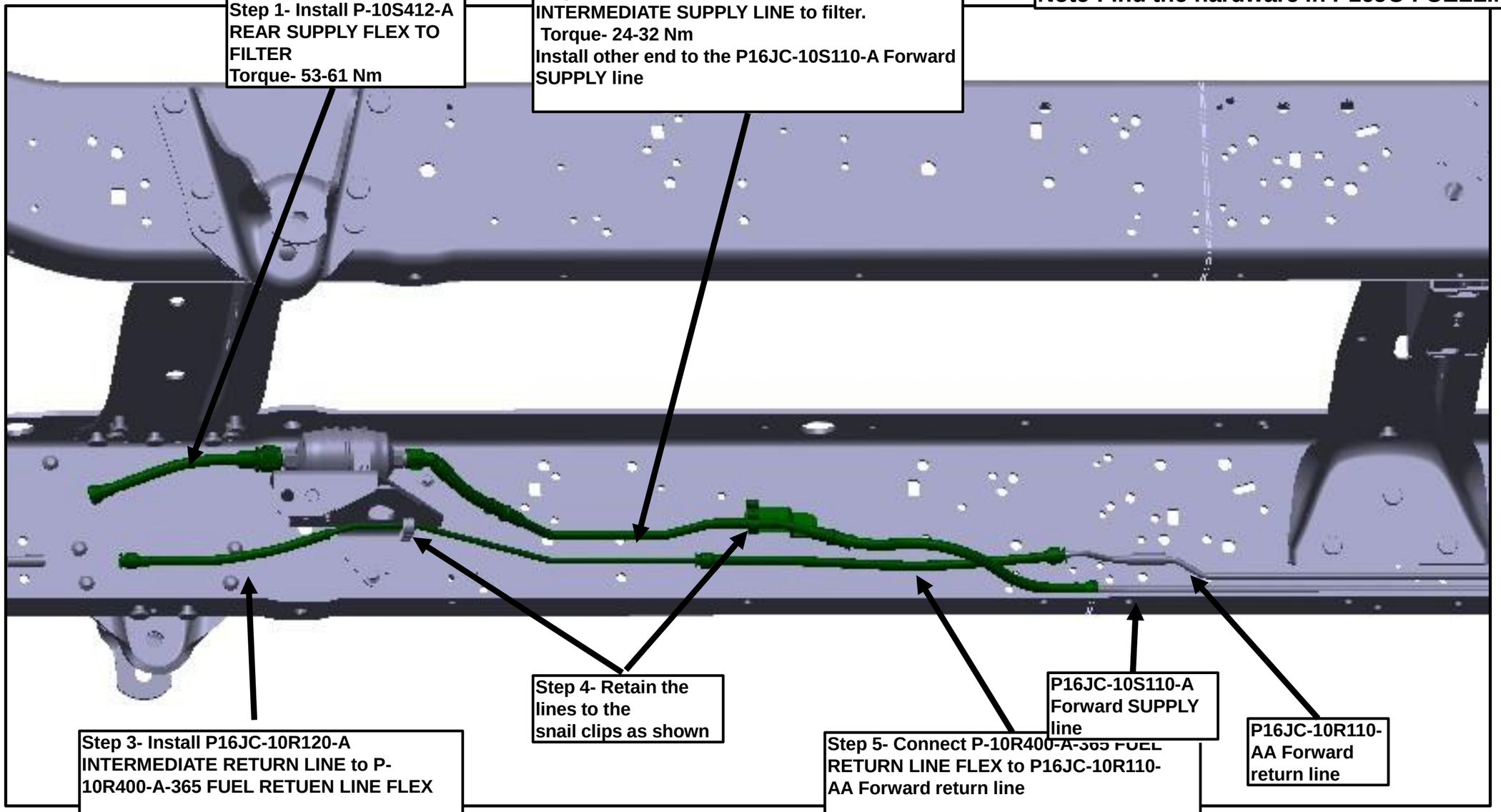


Note-Find the hardware in P16JC-FUEL1-AA and P16JC-FUELLINES-AA.

INSTALL THE INTERMEDIATE FUEL LINES FOR E-450 158 WB

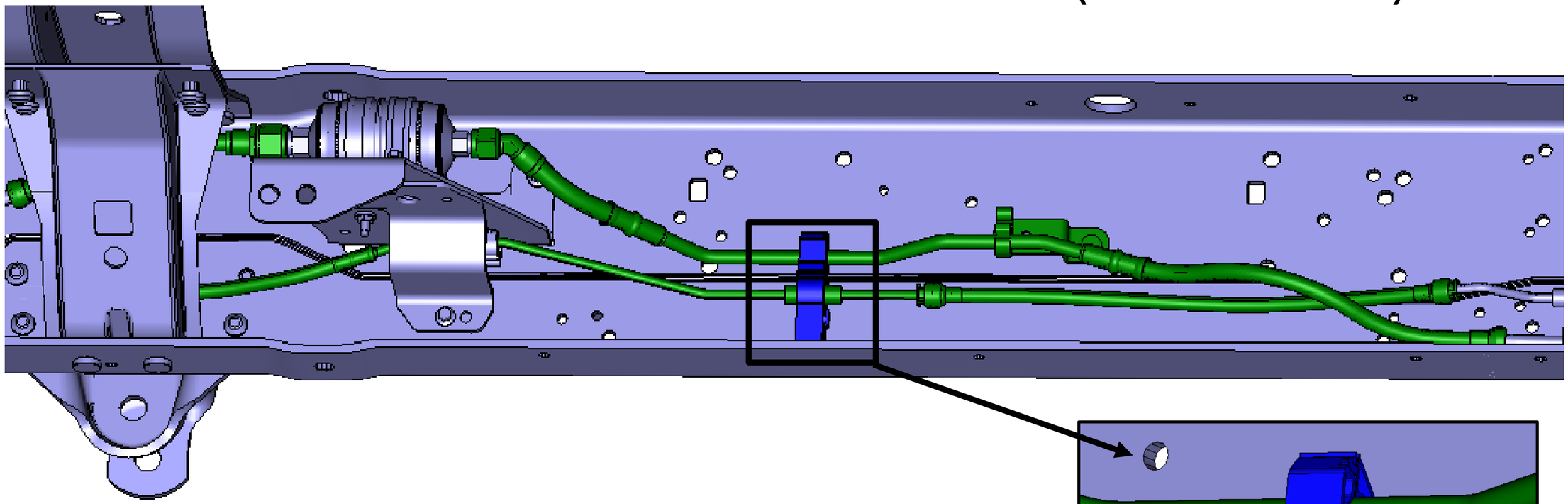
FRONT OF THE VEHICLE

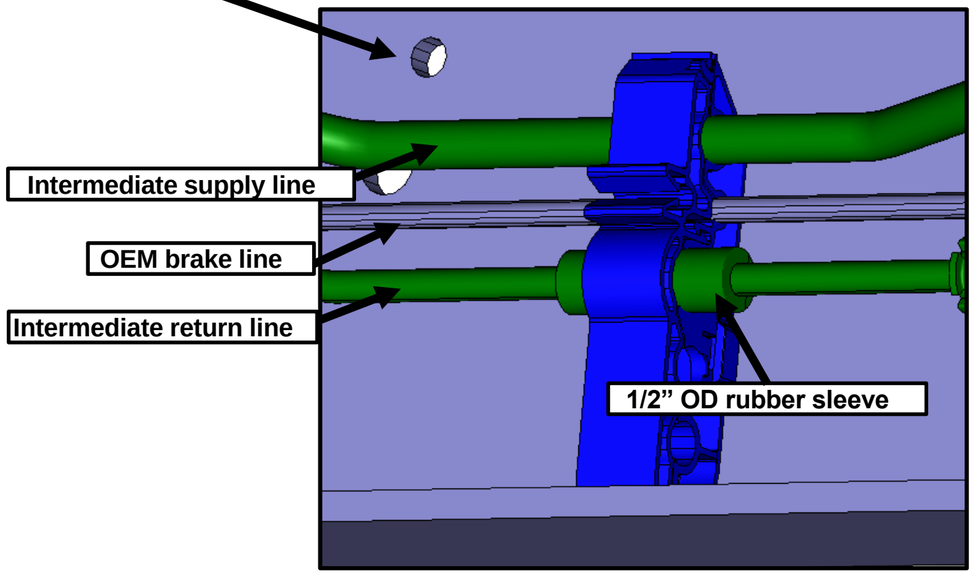
Note-Find the hardware in P16JC-FUELLINES-AA.



DISCARD REUSE NEW

INSTALL RUBBER SLEEVES ON INTERMEDIATE LINES – E-450 158WB ONLY (AND EXTENDED WB)

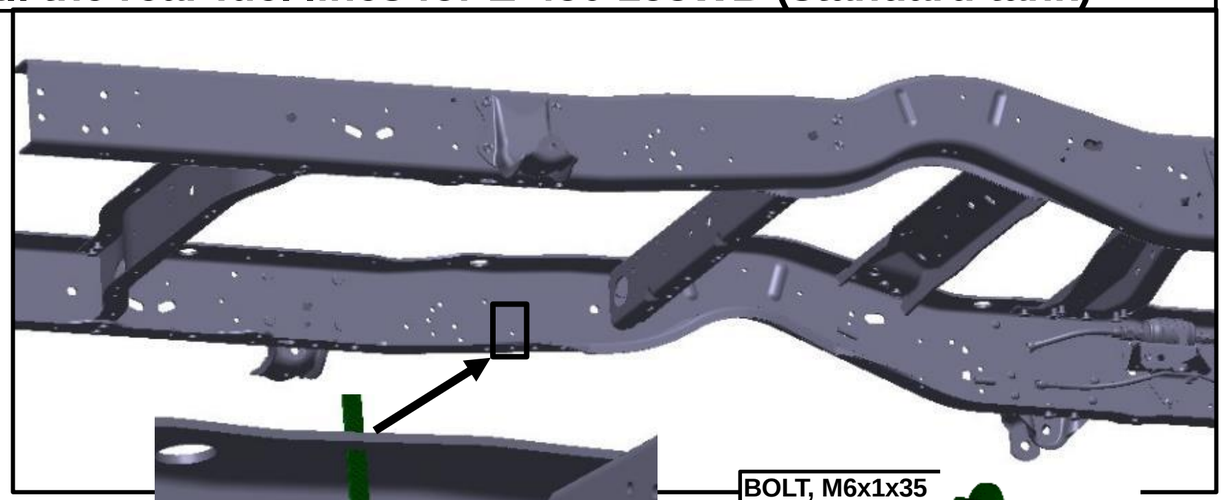


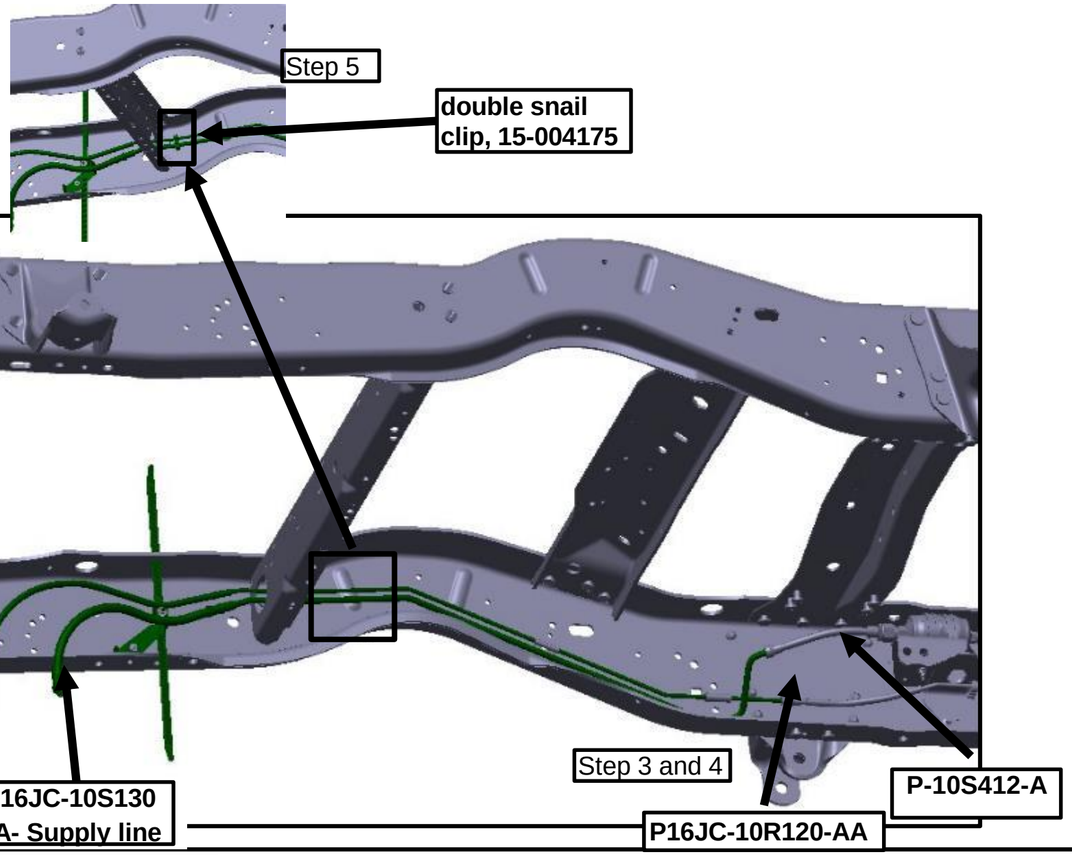


1. Install qty (1) ½” OD rubber sleeves (P07L3-9C328-A) on intermediate return line as shown
2. Close OEM fuel line clip

Install the rear fuel lines for E-450 158WB (standard tank)

1. Locate and install the fuel line mounting bracket with an M6 screw and weld nut to the frame using the pre-existing hole to install the bracket.
2. Mount the dual clamp tie to fuel lines loosely.
3. Connect the front end of the rear fuel supply line, P16JC-10S130-A to the P-10S412-A.
4. Connect the front end of the rear return line, P16JC-10R130-A to P16JC-10R120-A
5. Now retain the fuel lines to the mounting bracket using dual clamp tie and a double snail clip

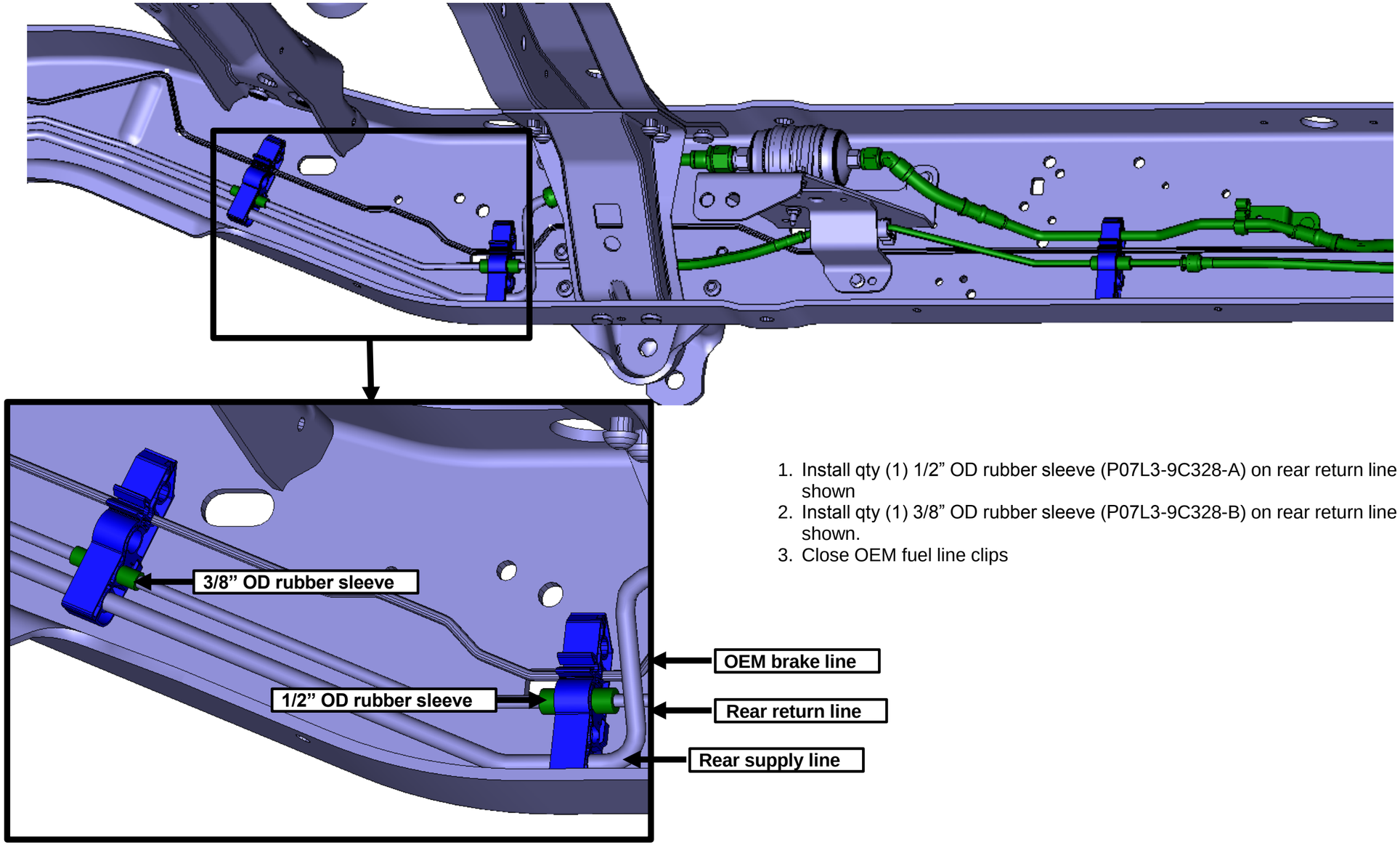




Note-Find the hardware in P16JC-FUEL1-AA and P16JC-FUELLINES-AA/BA

DISCARD REUSE NEW

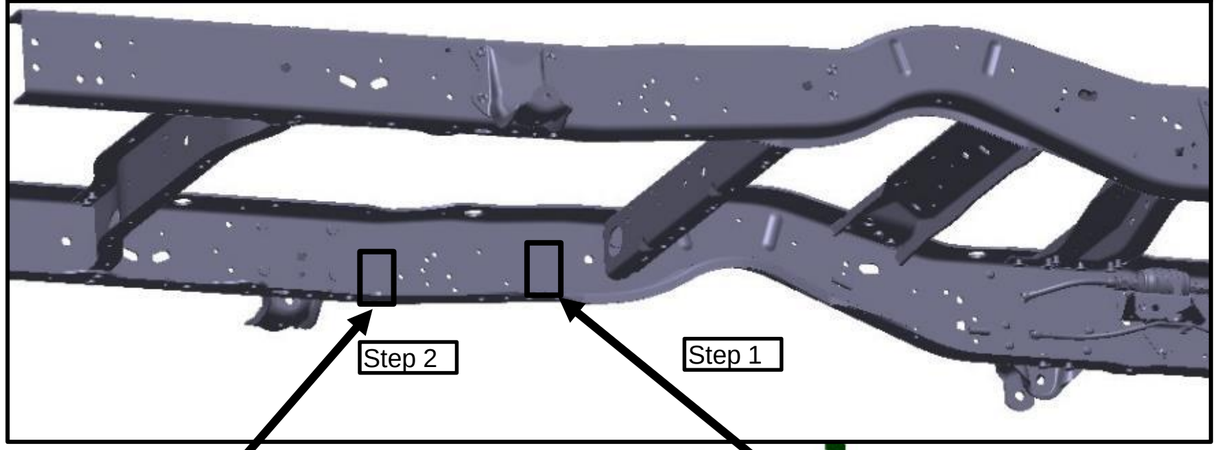
INSTALL RUBBER SLEEVES ON REAR LINES – E-450 158WB ONLY (AND EXTENDED WB)



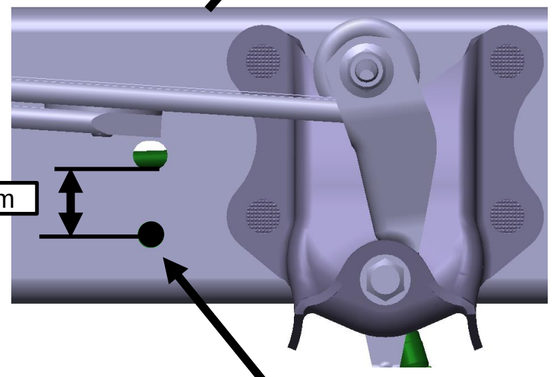
1. Install qty (1) 1/2” OD rubber sleeve (P07L3-9C328-A) on rear return line as shown
2. Install qty (1) 3/8” OD rubber sleeve (P07L3-9C328-B) on rear return line as shown.
3. Close OEM fuel line clips

ROUSH CleanTech Liquid Propane Autogas Fuel System: E-450/E-350 Dual Rear Wheel Cutaway and Stripped Chassis

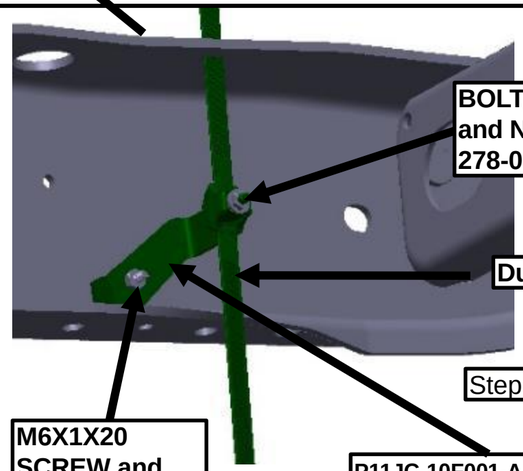
Install the rear fuel lines for E-450 158WB (extended range tank)



1. Locate and install the forward fuel line mounting bracket with an M6 screw and weld nut to the frame using the pre-existing hole to install the bracket.
2. For rear fuel line mounting bracket, drill a 5/16” hole approximately 35mm below hole that’s next to rear leaf spring shackle (see illustration) and then mount bracket using M6 screw with the weld nut to the frame.
3. Mount the dual clamp tie to fuel lines loosely.
4. Connect the front end of the rear fuel supply line, P16JC-10S130-B to the P-10S412-A.
5. Connect the front end of the rear return line, P16JC-10R130-B to P16JC-10R120-A
6. Now retain the fuel lines to the mounting brackets using dual clamp tie and double snail clip.



Measure 35mm below existing hole and use 5/16” drill bit



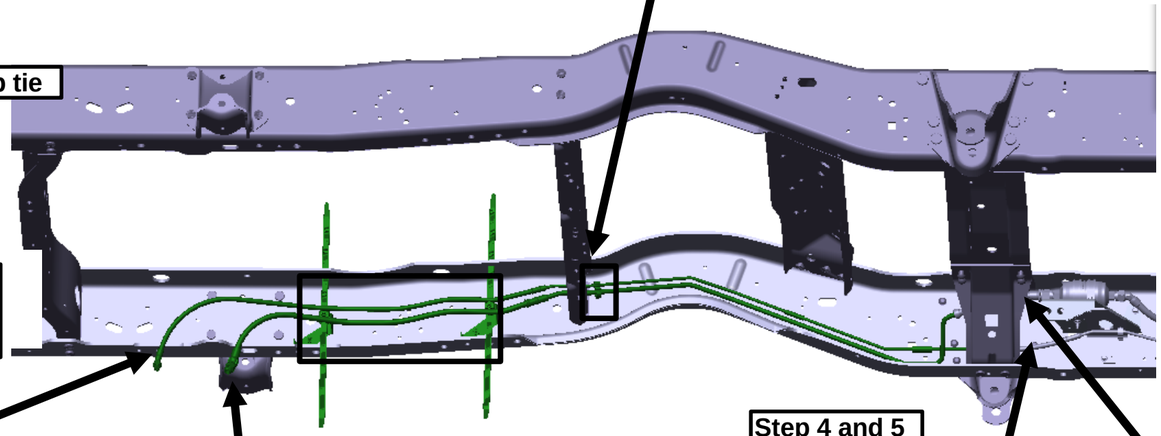
BOLT, M6x1x35 and NUT M6 11-278-0274

Dual clamp tie

M6X1X20 SCREW and M6 WELD Nut

P11JC-10F001-A fuel line mounting bracket

Step 3



P16JC-10R130 -B- Return line

P16JC-10S130-B – Supply Line

P16JC-10R120-AA

P-10S412-A

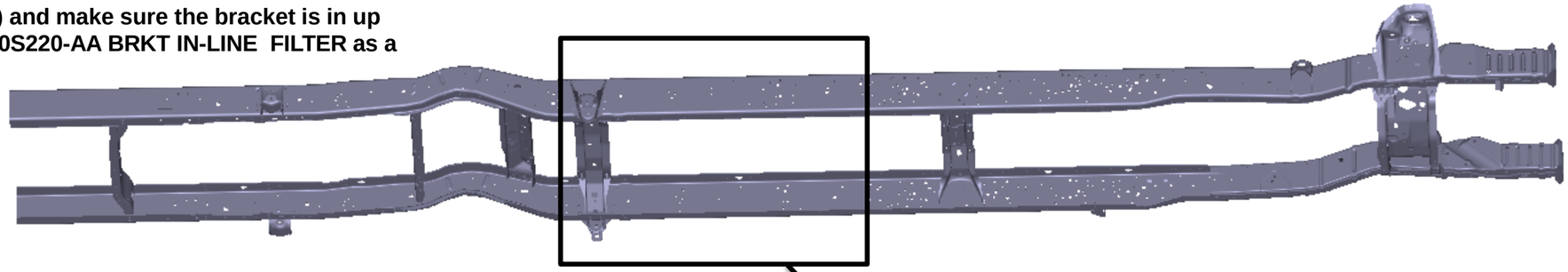
Front of the vehicle

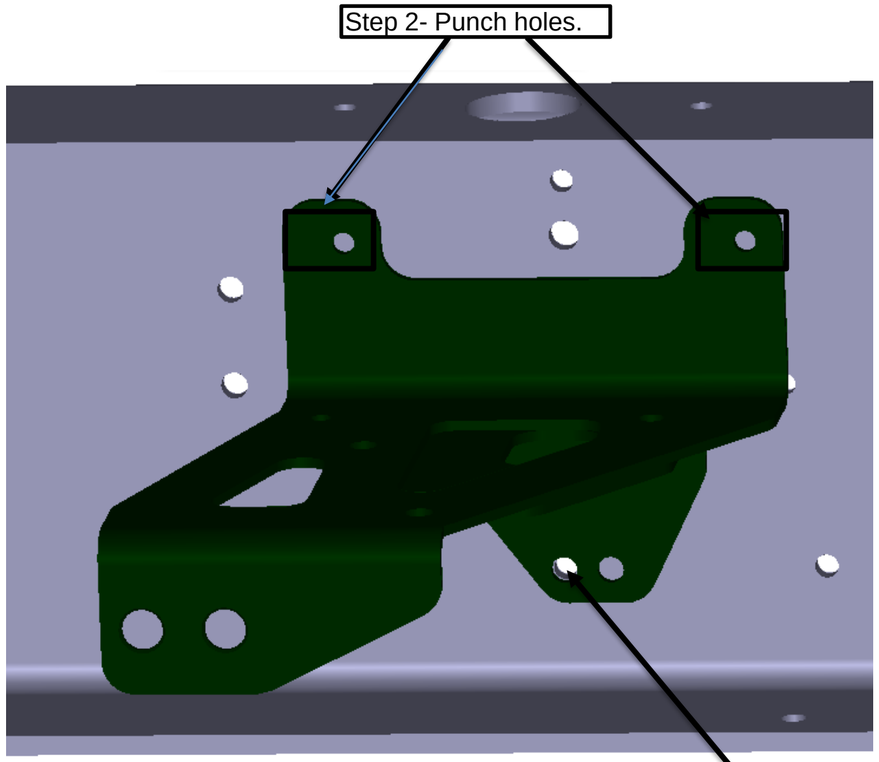
Note-Find the hardware in P16JC-FUEL1-BA and P16JC-FUELLINES-AA/BA

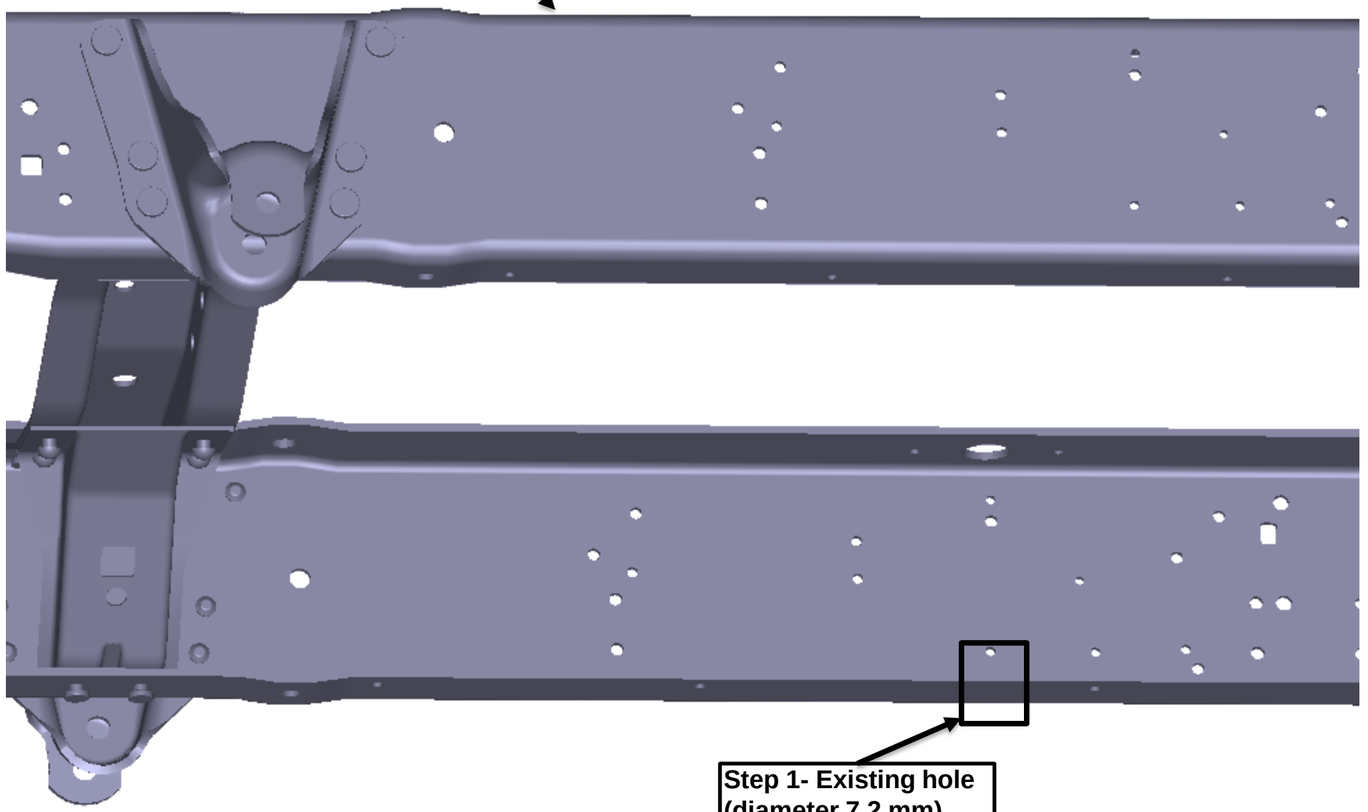
LOCATION OF IN-LINE FILTER MOUNTING BRACKET FOR E-450 176 WB

1. **Locate of the pre- existing hole on the frame.**
2. **Align the bracket with the existing hole (diameter 7.2 mm) and make sure the bracket is in up straight position, then punch two holes by using P16JC-10S220-AA BRKT IN-LINE FILTER as a template.**
3. **Drill 6mm hole at the two punched spots.**

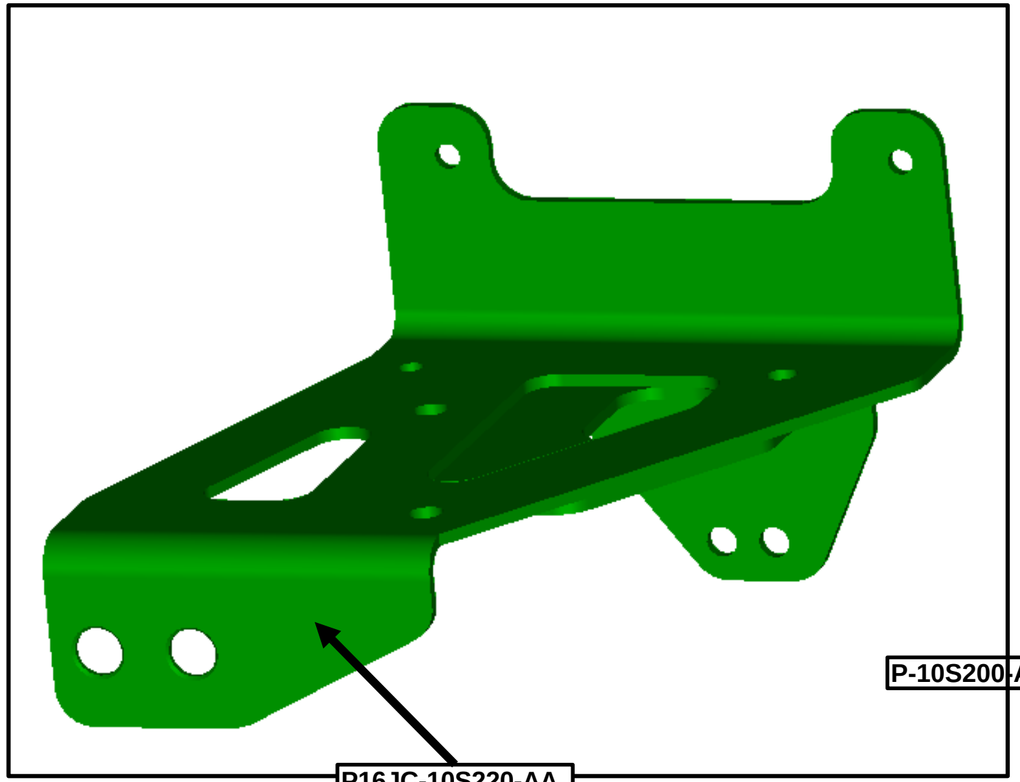
FRONT OF THE VEHICLE



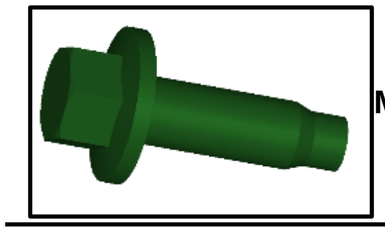




MOUNT THE IN-LINE FILTER TO THE IN-LINE BRACKET FOR E-450 176 WB

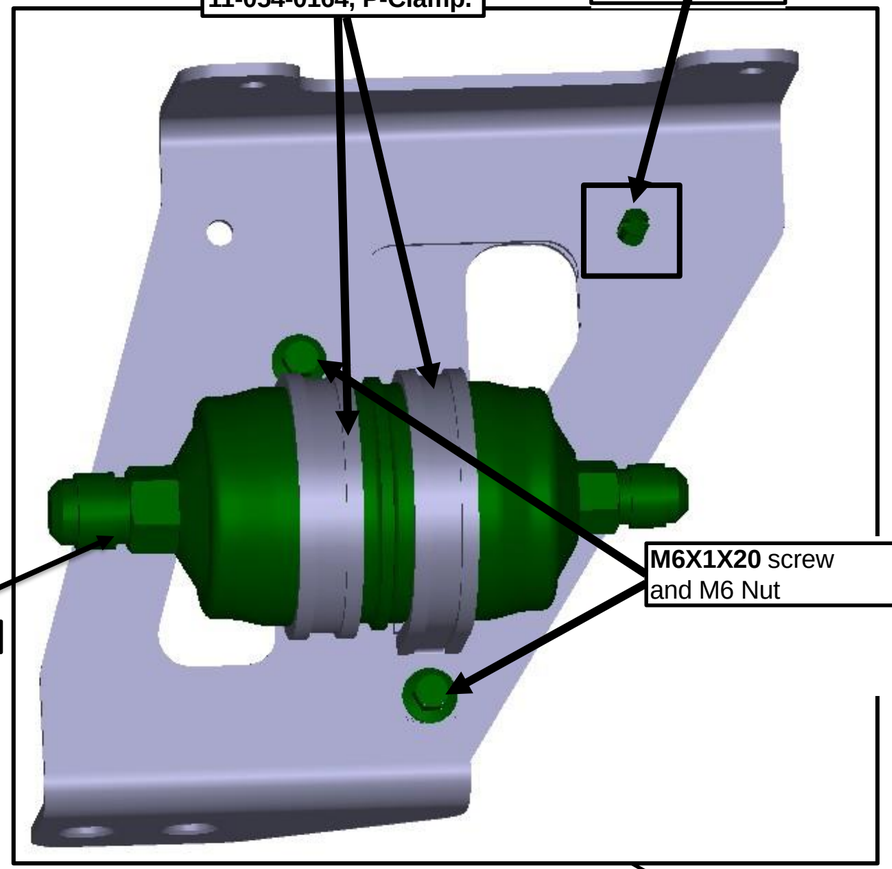


P16JC-10S220-AA
BRKT IN-LINE
FILTER.



M6X1X20 screw

On Bench

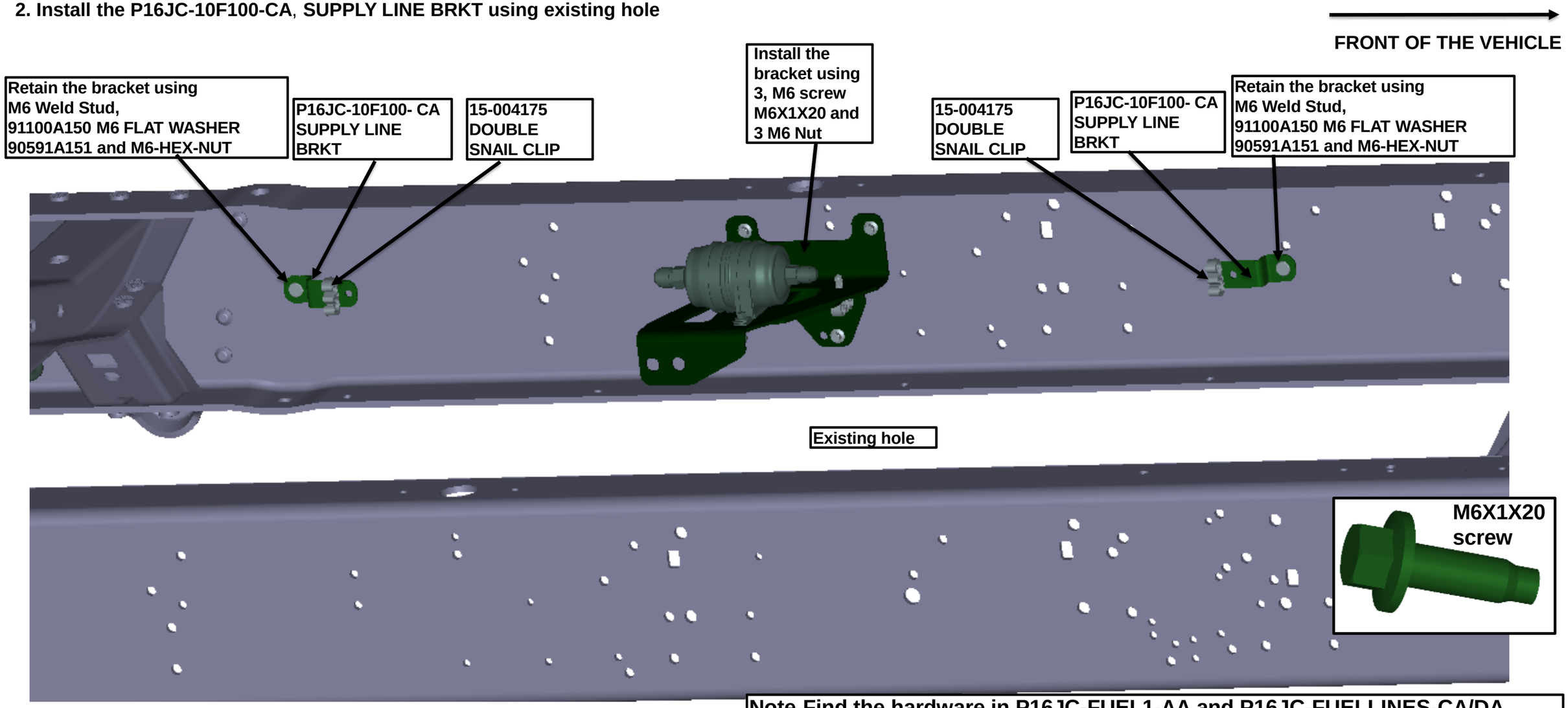


Find the hardware in P16JC-FUEL1-AA

INSTALL THE IN-LINE FILTER BRACKET AND THE FUEL LINE BRACKET FOR E-450 176 WB

1.Install the In-filter bracket with the M6 bolt and nut as shown.

2. Install the P16JC-10F100-CA, SUPPLY LINE BRKT using existing hole



Note-Find the hardware in P16JC-FUEL1-AA and P16JC-FUELLINES-CA/DA

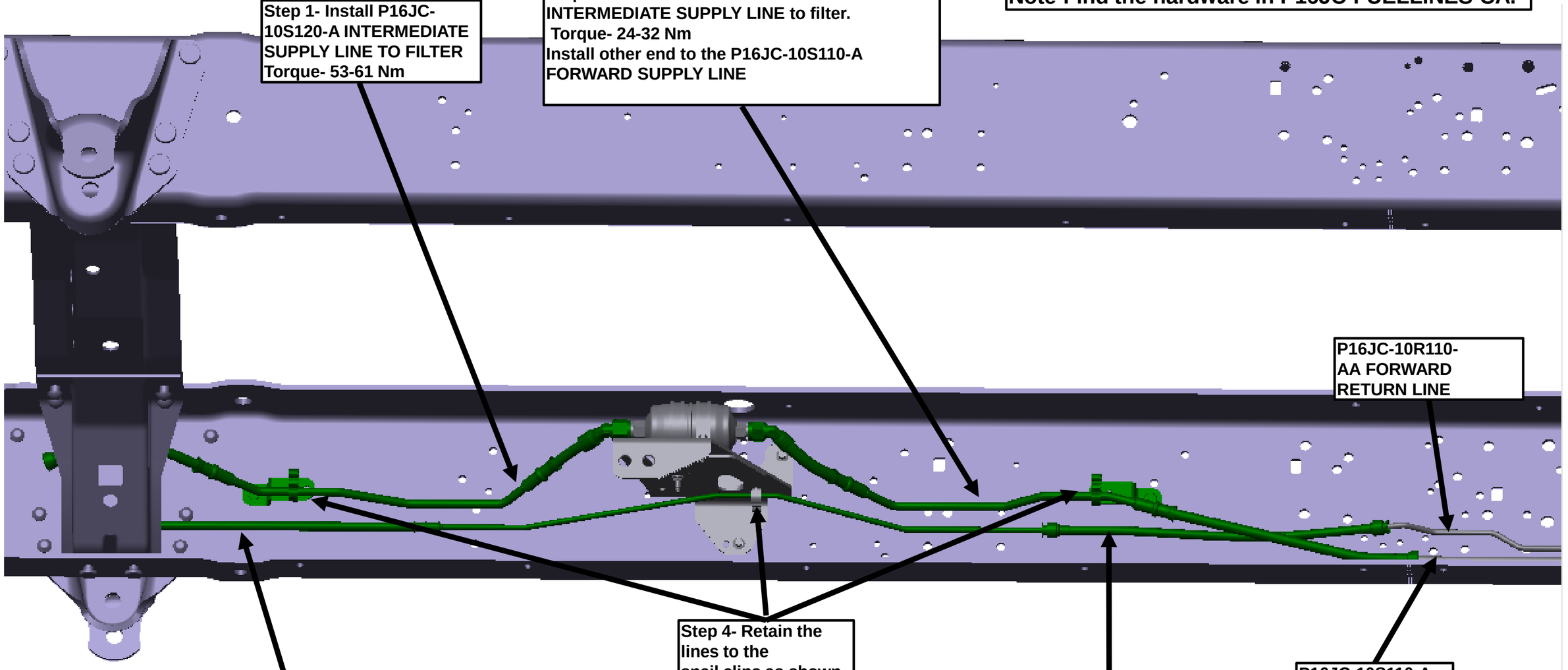
INSTALL THE INTERMEDIATE FUEL LINES FOR E-450 176 WB

FRONT OF THE VEHICLE

Step 1- Install P16JC-10S120-A INTERMEDIATE SUPPLY LINE TO FILTER
Torque- 53-61 Nm

Step 2- Install P16JC-10S120-BA INTERMEDIATE SUPPLY LINE to filter.
Torque- 24-32 Nm
Install other end to the P16JC-10S110-A FORWARD SUPPLY LINE

Note-Find the hardware in P16JC-FUELLINES-CA.



P16JC-10R110-AA FORWARD RETURN LINE

Step 4- Retain the lines to the snail clips as shown

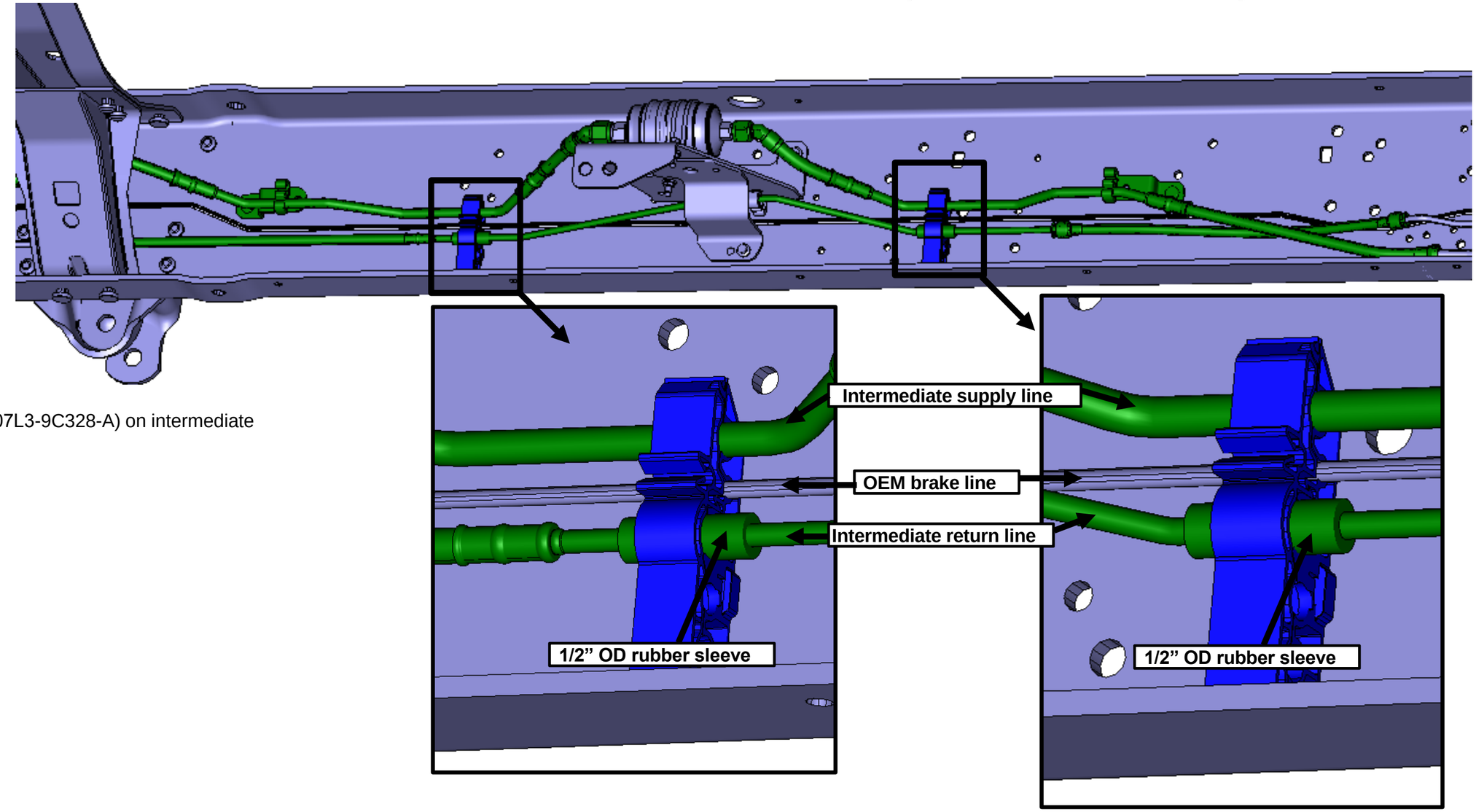
Step 3- Install P16JC-10R120-B INTERMEDIATE RETURN LINE to P-10R400-A-365 FUEL RETUEN LINE FLEX

Step 5- Connect P-10R400-A-365 FUEL RETURN LINE to P16JC-10R110-A FORWARD RETURN LINE

P16JC-10S110-A Forward SUPPLY line

DISCARD REUSE NEW

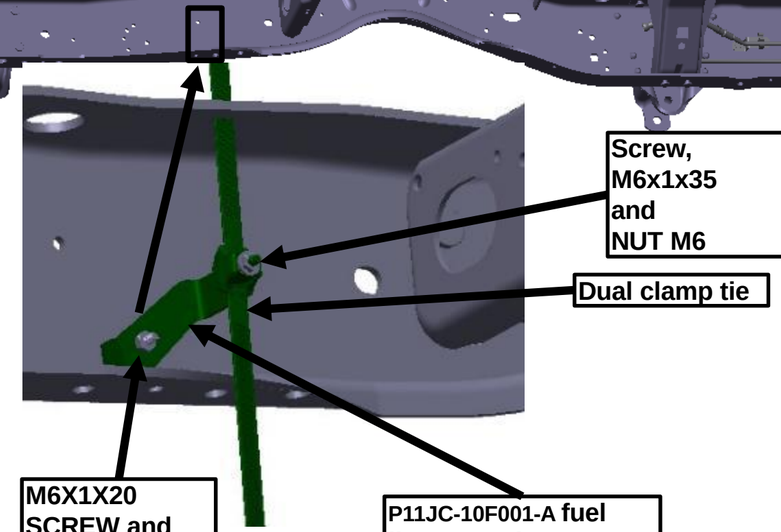
INSTALL RUBBER SLEEVES ON INTERMEDIATE LINES – E-450 176WB ONLY (AND EXTENDED WB)

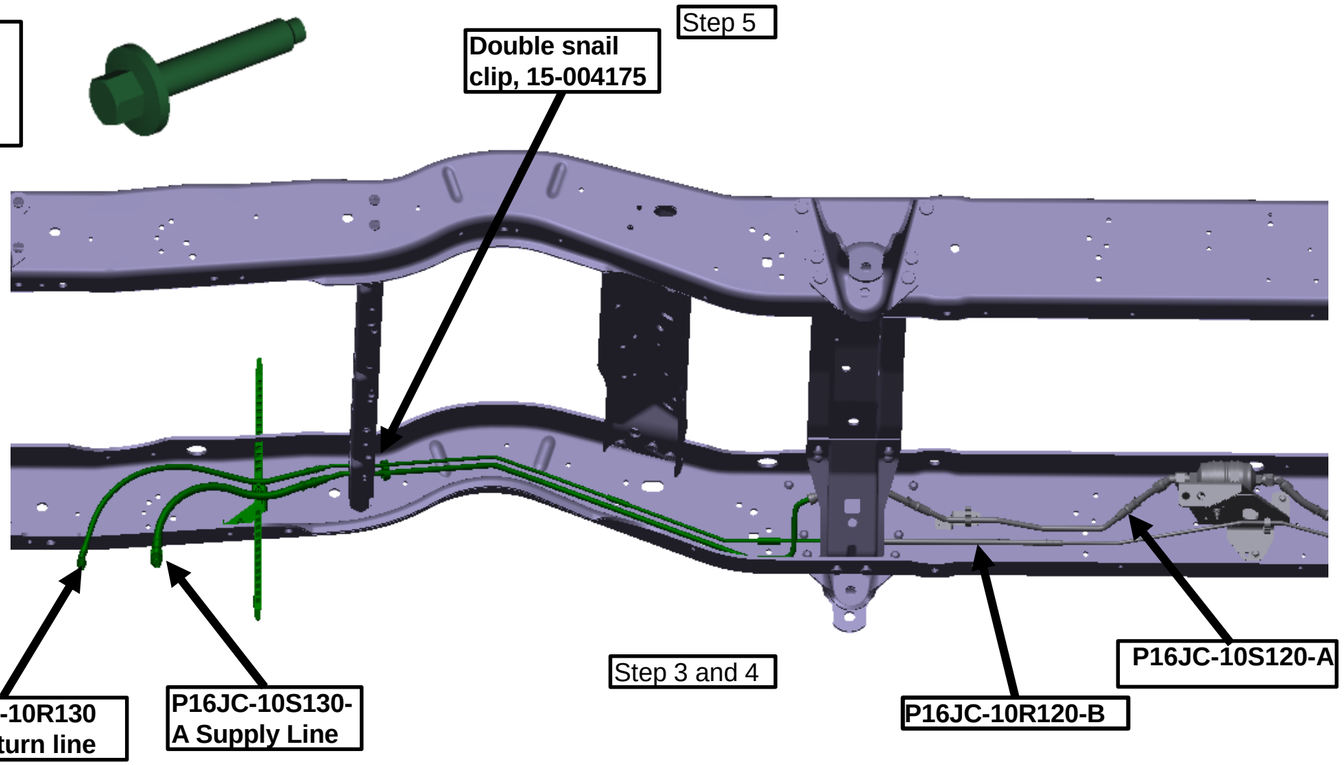


1. Install qty (2) 1/2” OD rubber sleeves (P07L3-9C328-A) on intermediate return line as shown
2. Close OEM fuel line clips

Install the rear fuel lines for E-450 176WB (standard tank)

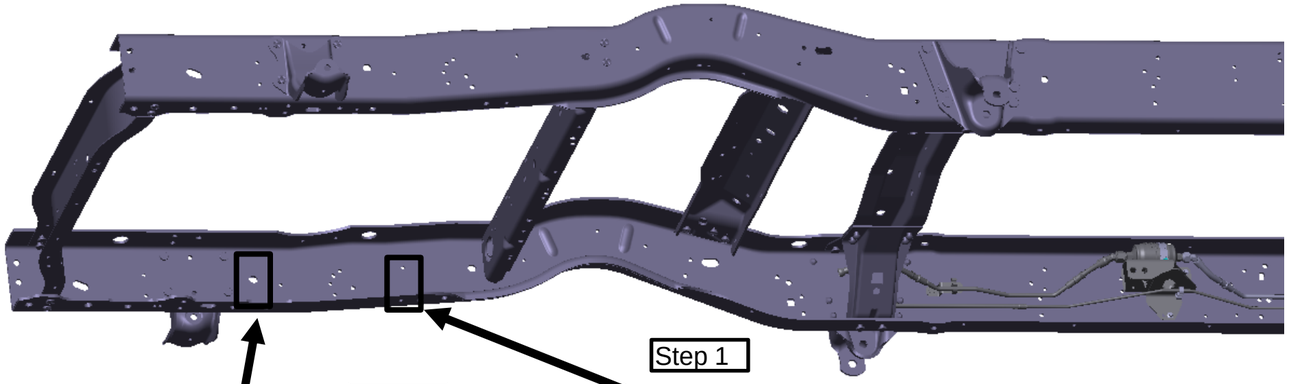
1. Locate and install the fuel line mounting bracket with an M6 screw and weld nut to the frame using the pre-existing hole to install the bracket.
2. Mount the dual clamp tie to the fuel lines loosely.
3. Connect the front end of the rear fuel supply line, P16JC-10S130-A to P16JC-10S120-A.
4. Connect the front end of the rear return line, P16JC-10R130-AA to P16JC-10R120-B.
5. Now retain the fuel lines to the mounting bracket using dual clamp tie and a double snail clip.

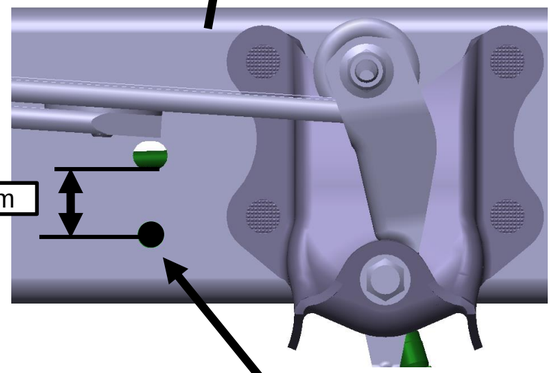


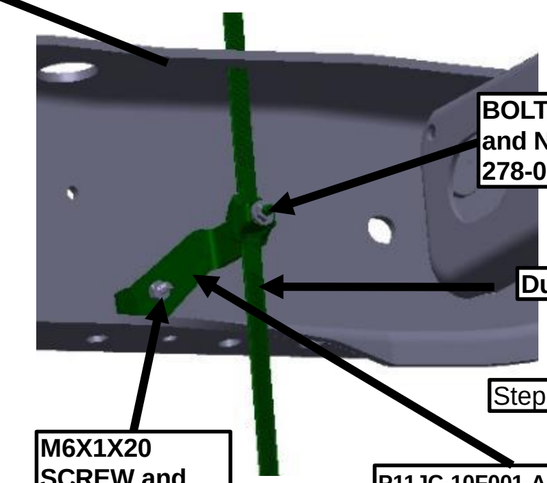


Note-Find the hardware in P16JC-FUEL1-AA and P16JC-FUELLINES-CA/DA

Install the rear fuel lines for E-450176WB (extended range tank)



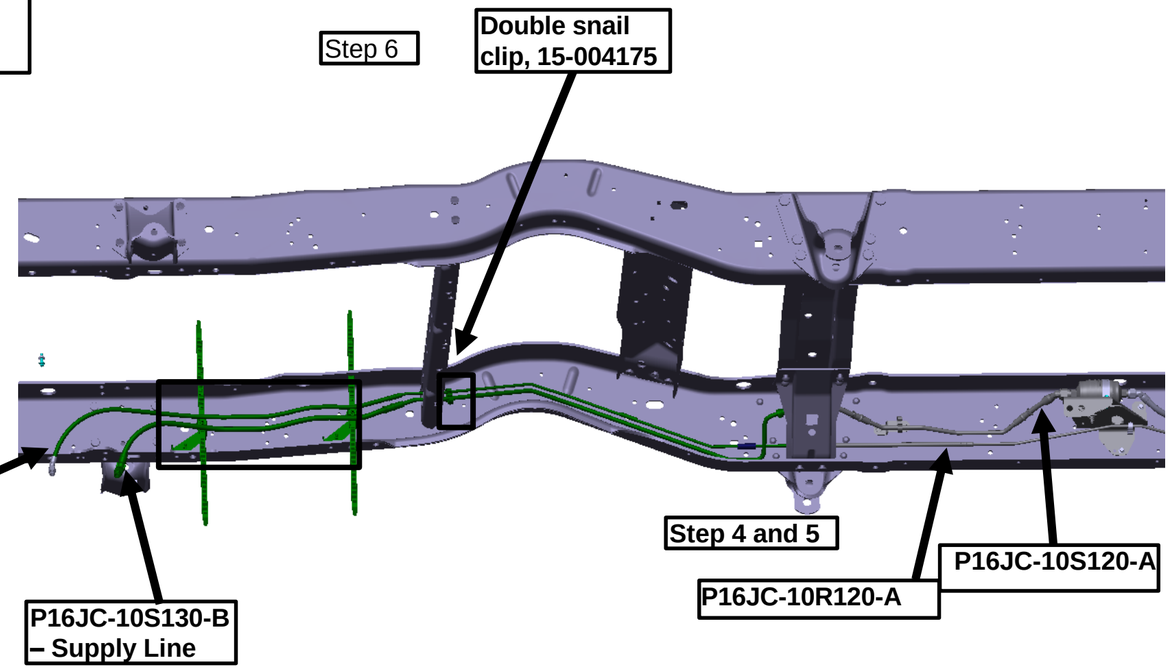




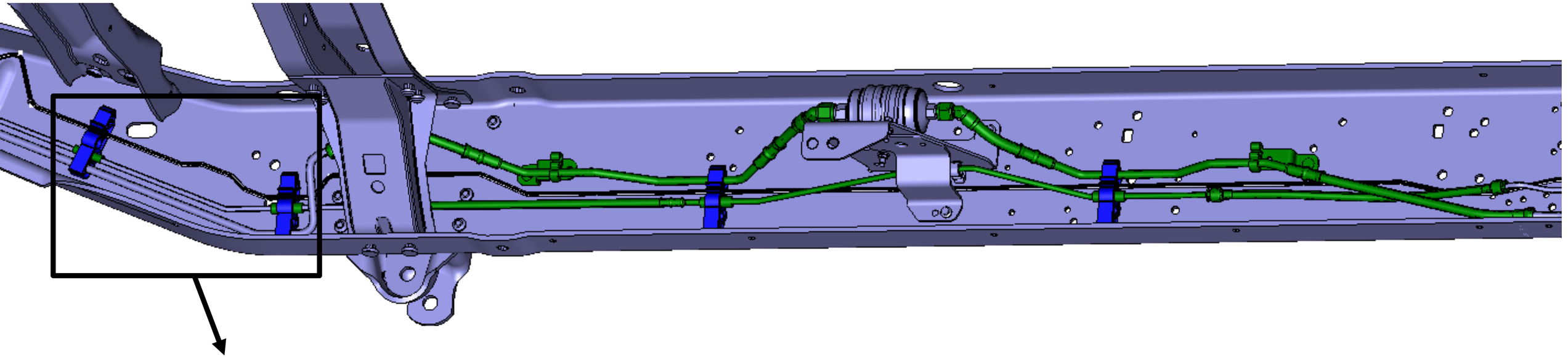
Front of the vehicle

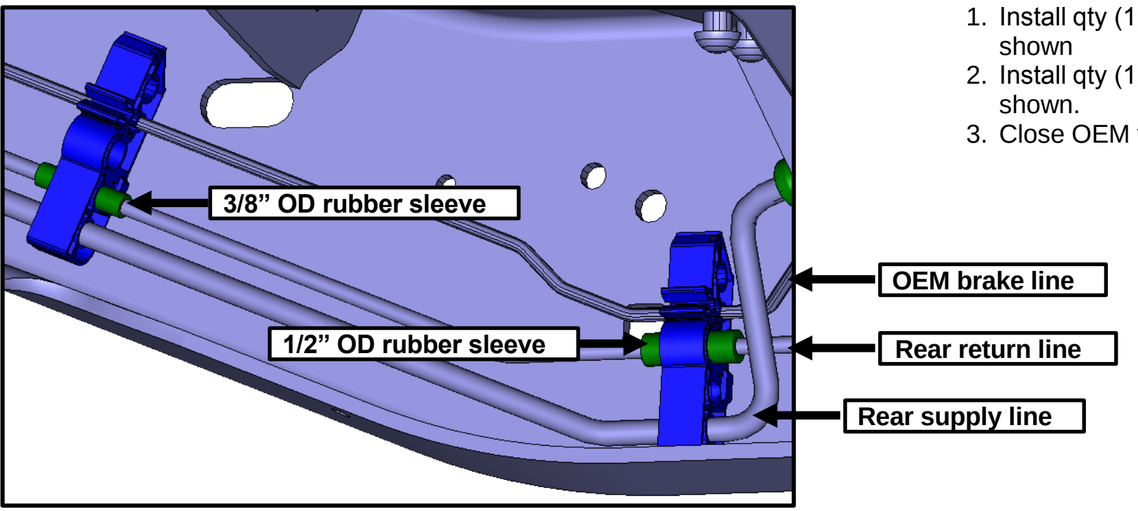
Note-Find the hardware in P16JC-FUEL1-BA and P16JC-FUELLINES-CA/DA

1. Locate and install the forward fuel line mounting bracket with an M6 screw and weld nut to the frame using the pre-existing hole to install the bracket.
2. For rear fuel line mounting bracket, drill a 5/16” hole approximately 35mm below hole that’s next to rear leaf spring shackle (see illustration) and then mount bracket using M6 screw with the weld nut to the frame.
3. Mount the dual clamp tie to fuel lines loosely.
4. Connect the front end of the rear fuel supply line, P16JC-10S130-B to P16JC-10S120-A.
5. Connect the front end of the rear return line, P16JC-10R130-B to P16JC-10R120-A
6. Now retain the fuel lines to the mounting brackets using dual clamp ties and double snail clip



INSTALL RUBBER SLEEVES ON REAR LINES – E-450 176WB ONLY (AND EXTENDED WB)

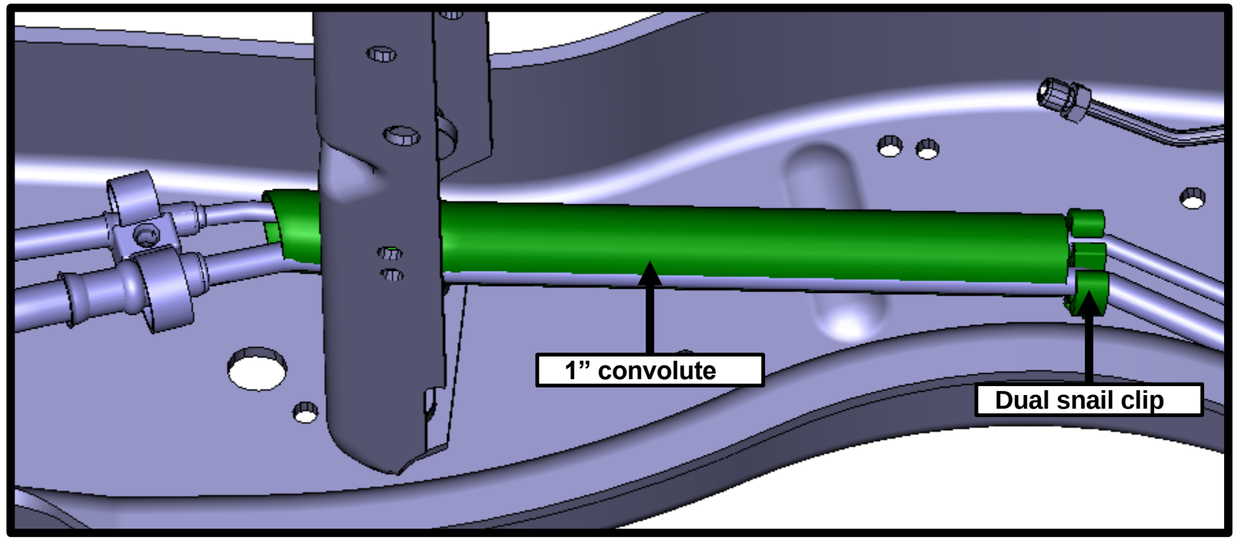


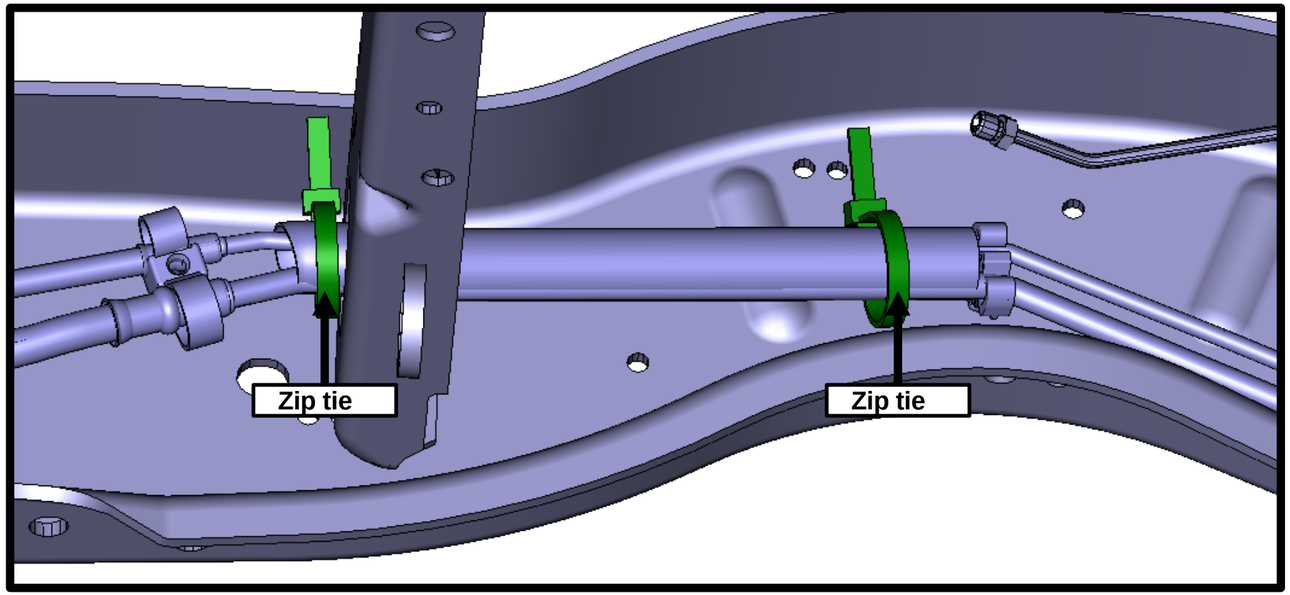


1. Install qty (1) 1/2” OD rubber sleeve (P07L3-9C328-A) on rear return line as shown
2. Install qty (1) 3/8” OD rubber sleeve (P07L3-9C328-B) on rear return line as shown.
3. Close OEM fuel line clips

INSTALL CONVOLUTE AND DUAL SNAIL CLIP ON REAR LINES

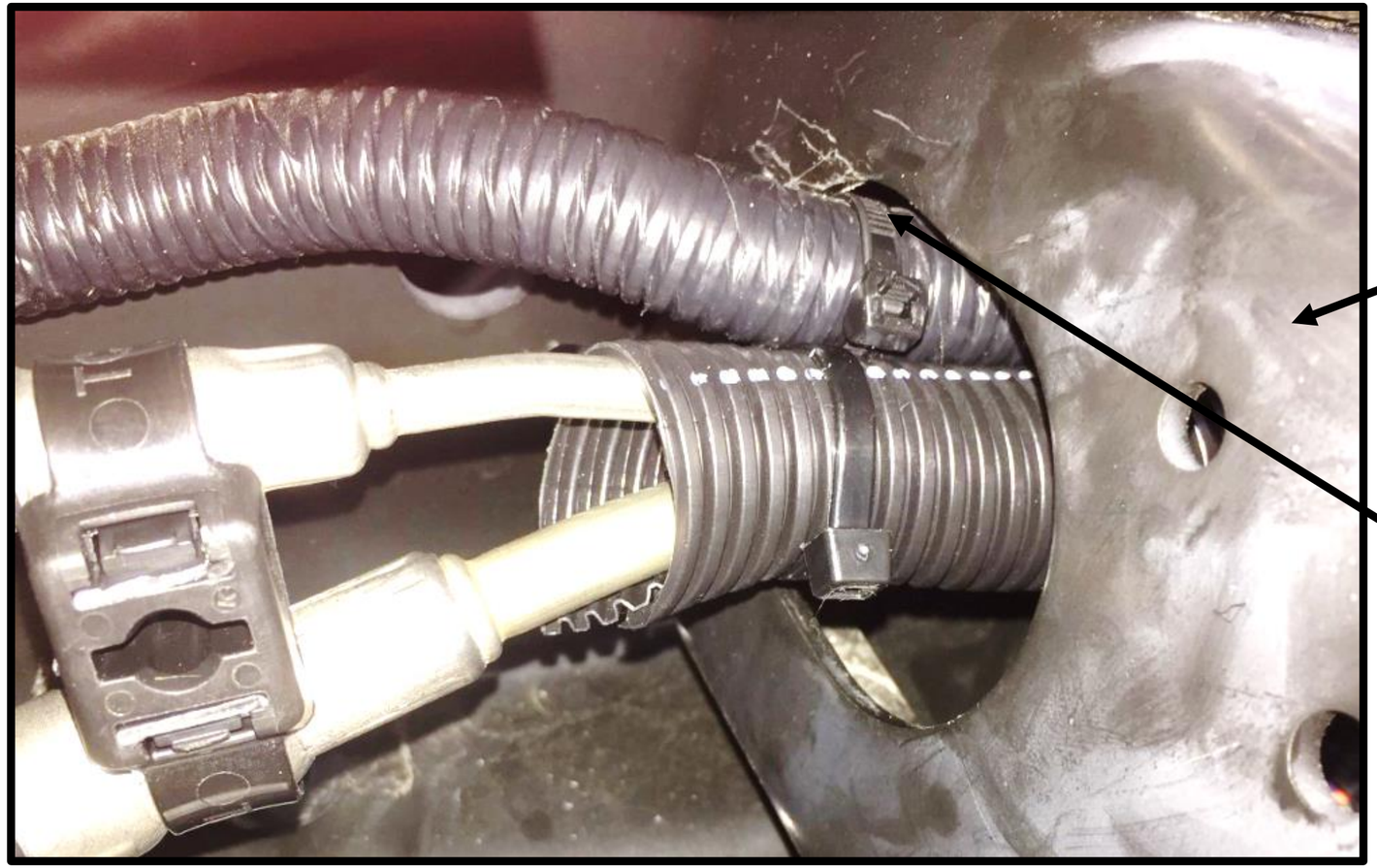
1. **Install 1” x 254mm long convolute (PLS-1-100-BLK-254) on both rear lines where lines passes through crossmember**
2. **Install dual snail clip (15-004175) on rear lines in front of convolute as shown**
3. **Retain convolute to lines using qty 2 zip ties (20-403-0003)**

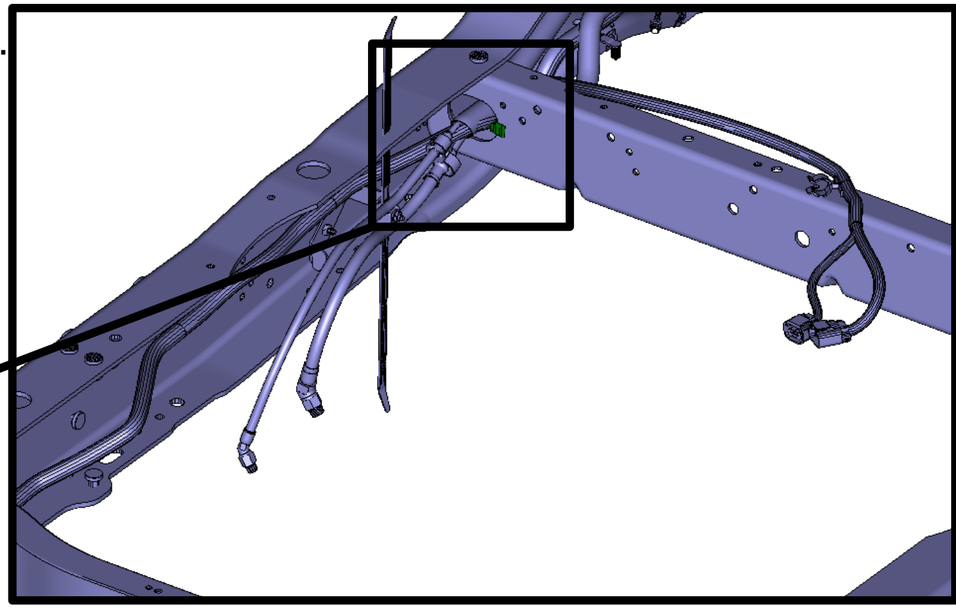


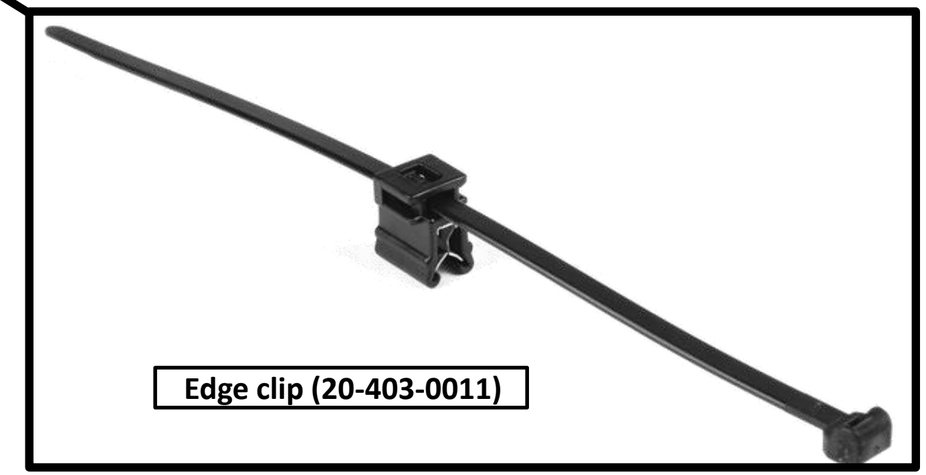


RETAIN OEM HARNESS AWAY FROM REAR FUEL LINES

1. **Use edge clip (20-403-0011) to retain OEM harness away from rear fuel lines at rear crossmember hole as shown.**





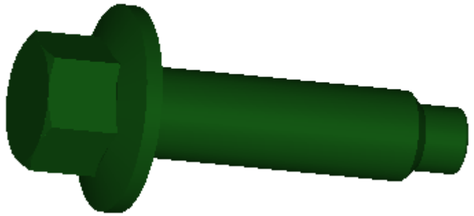


Edge clip (20-403-0011)

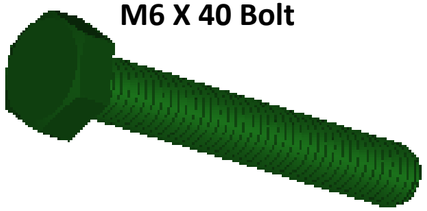
INSTALL FUEL COOLER KIT (IF APPLICABLE)

1. Locate two holes 9.2 mm next to In-line filter on the frame and Position P16JC-10H101-A, fuel cooler bracket; will align to holes in the frame; the remaining two holes should be drilled
2. On Bench, Attach fuel cooler to bracket with two p-clamps, two M6 bolts, and two nuts M6 U-type, torque bolts to 8- 12 Nm.
3. Install Fitting- P13-S0-12A150-AA female O-ring, 2 Quantity.
4. Install four M6 X 40 Bolt and four 11-037-0100 M6 Isolator

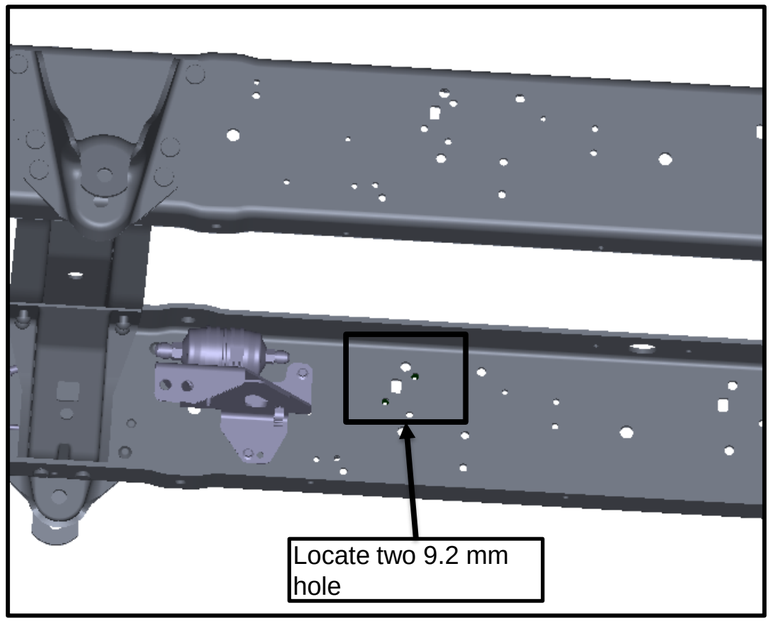
M6 bolt



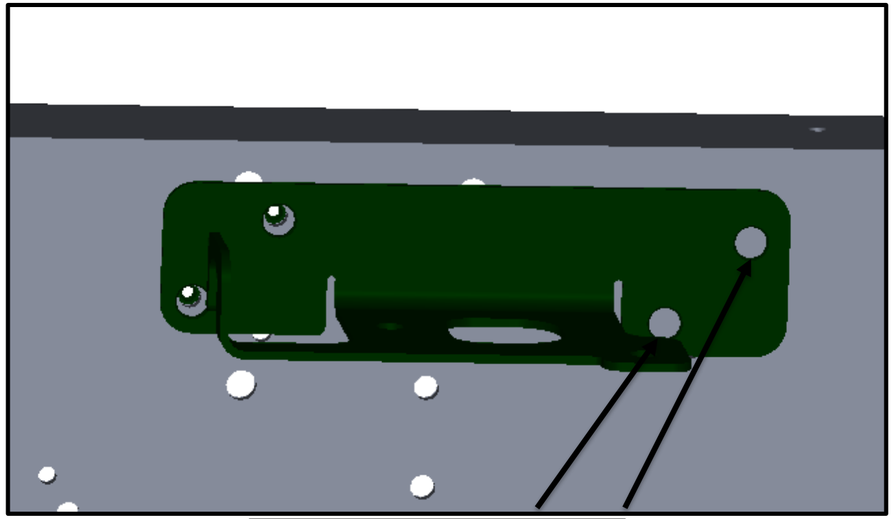
M6 X 40 Bolt



Step 1

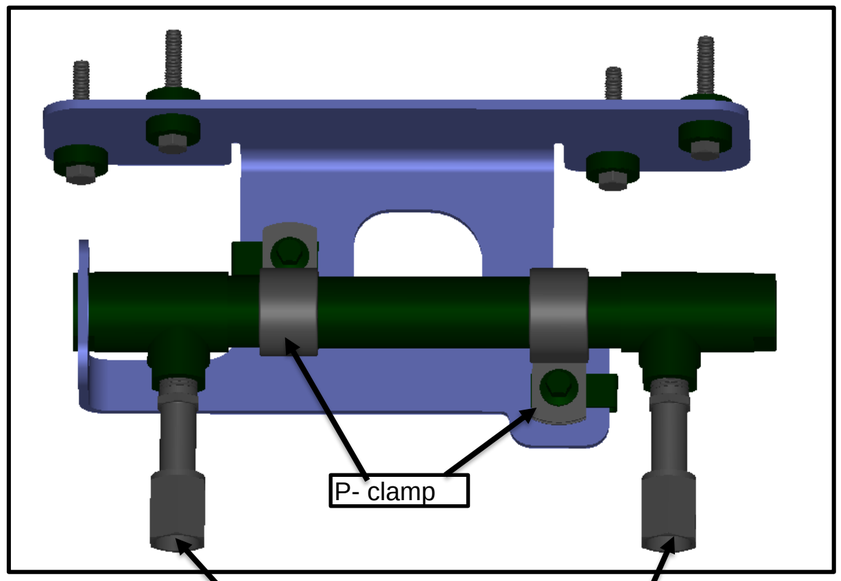


Step 1



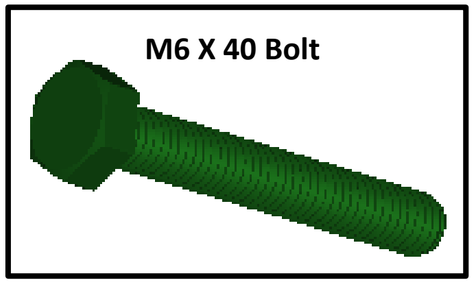
On Bench

Step 2, 3 and 4

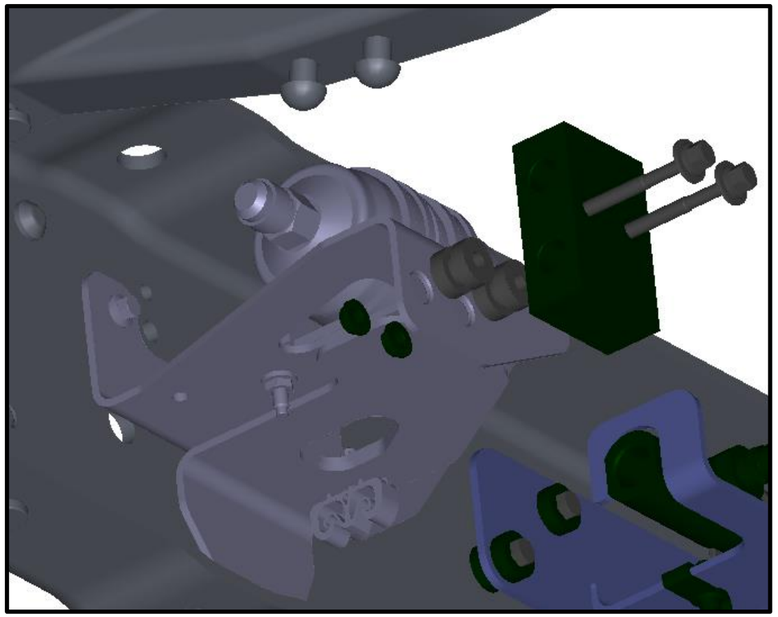


INSTALL FUEL COOLER KIT (IF APPLICABLE)

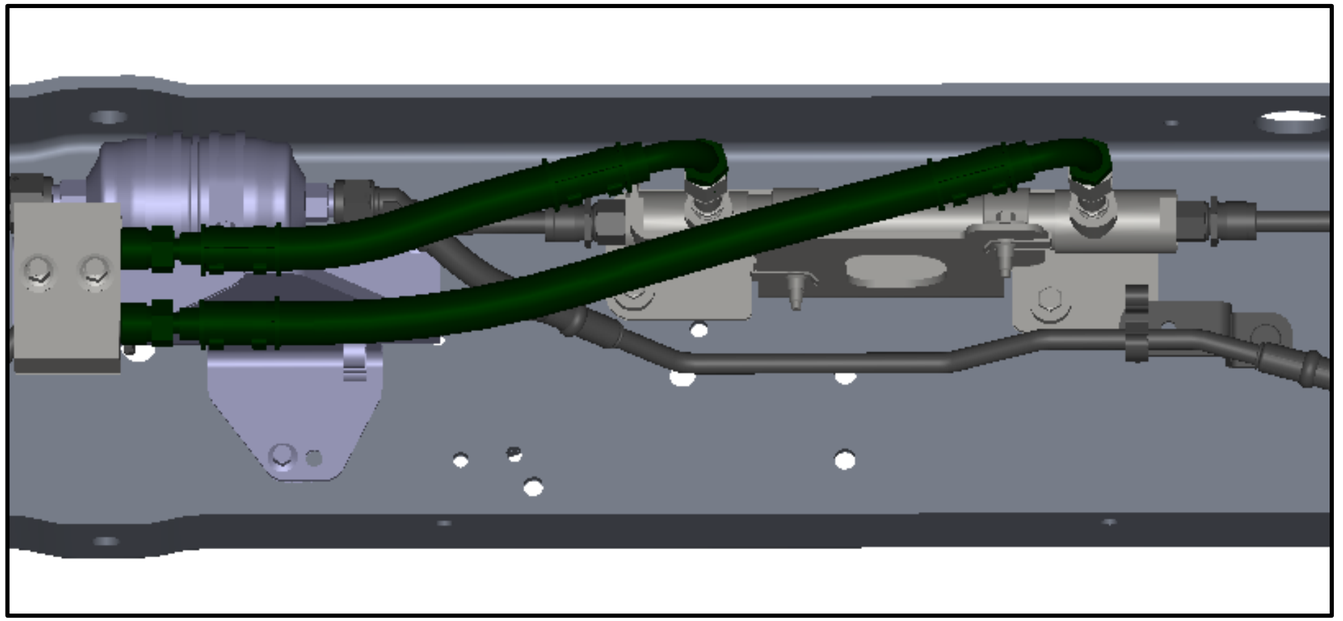
1. **Attach TXV to filter bracket with two 11-037-0100 M6 isolators, two M6X62 bolts and two M6 nuts; torque bolts to 8- 12 Nm.**
2. **Install jumper line from fuel cooler to forward line P16JC-12A100-A and P16JC-12A100-B.**



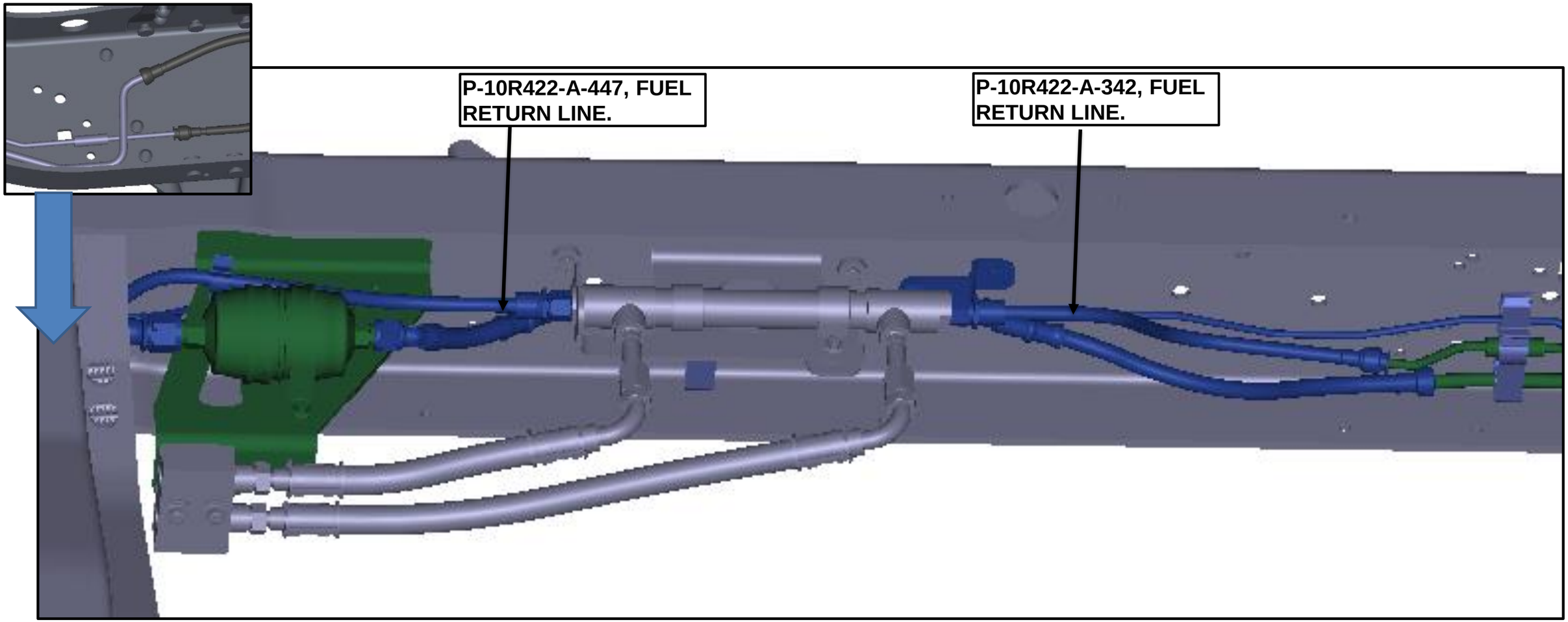
Step 1



Step 2



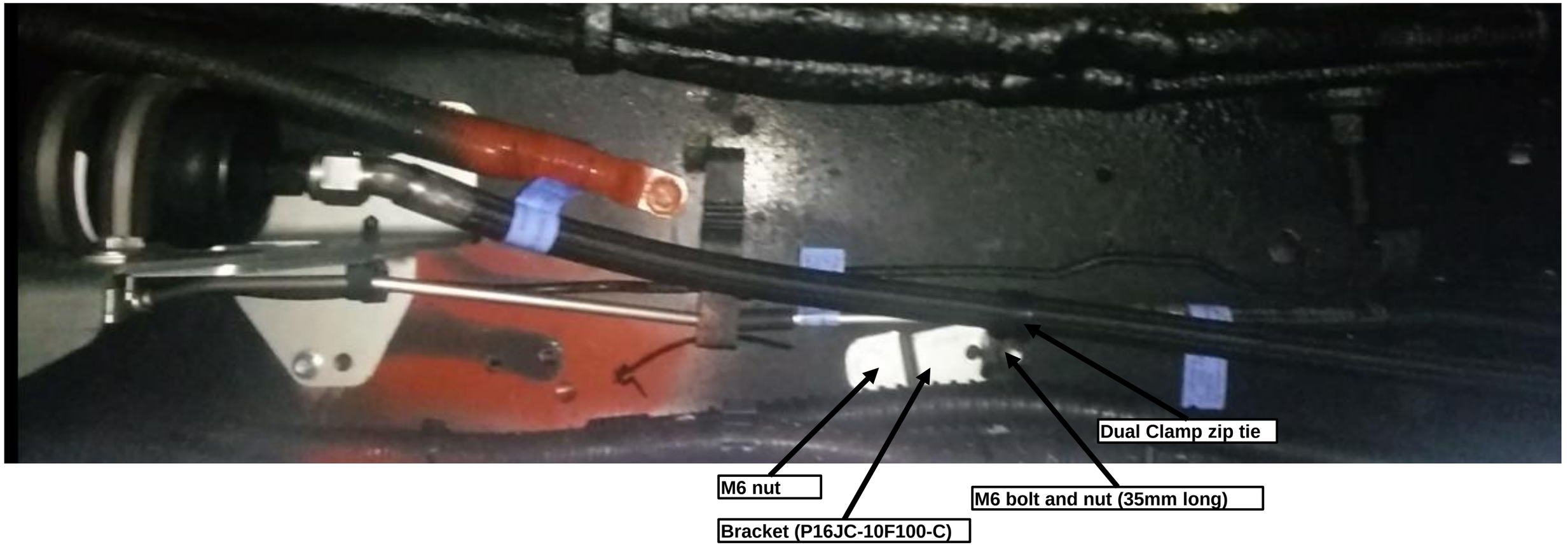
INSTALL FUEL RETURN LINES TO COOLER



EXTENDED WHEELBASES – FUEL LINE RETENTION

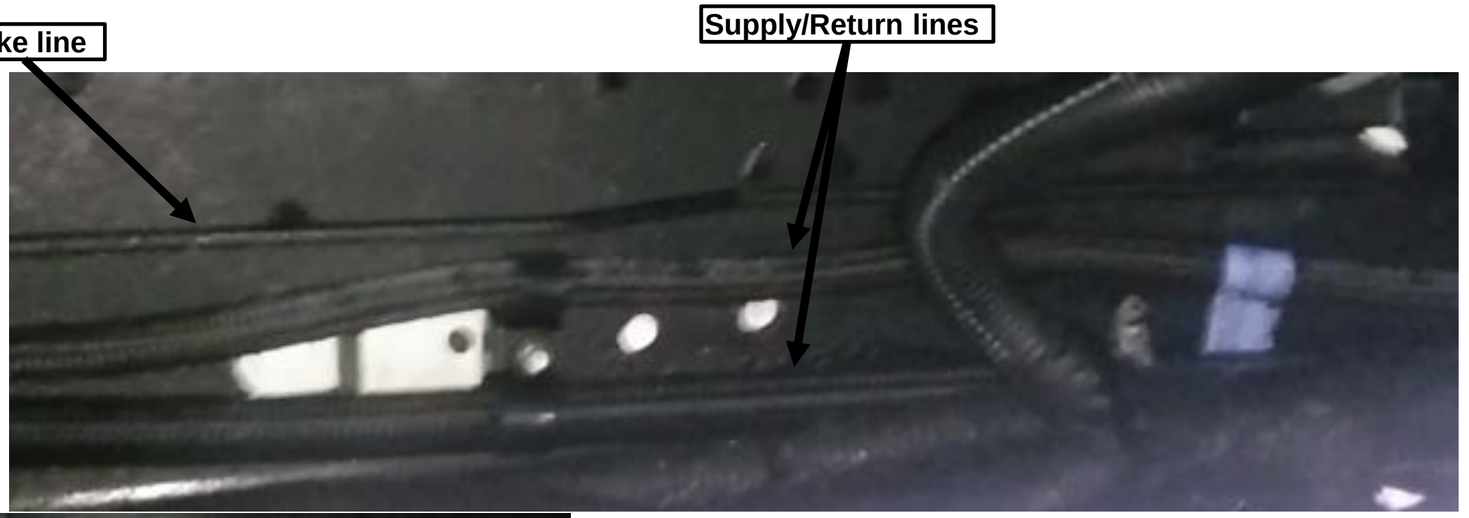
These instructions apply only to vehicles with modified/extended wheelbases from the Ford factory wheelbases. Refer to Ford Bodybuilder book for frame extension guidelines.

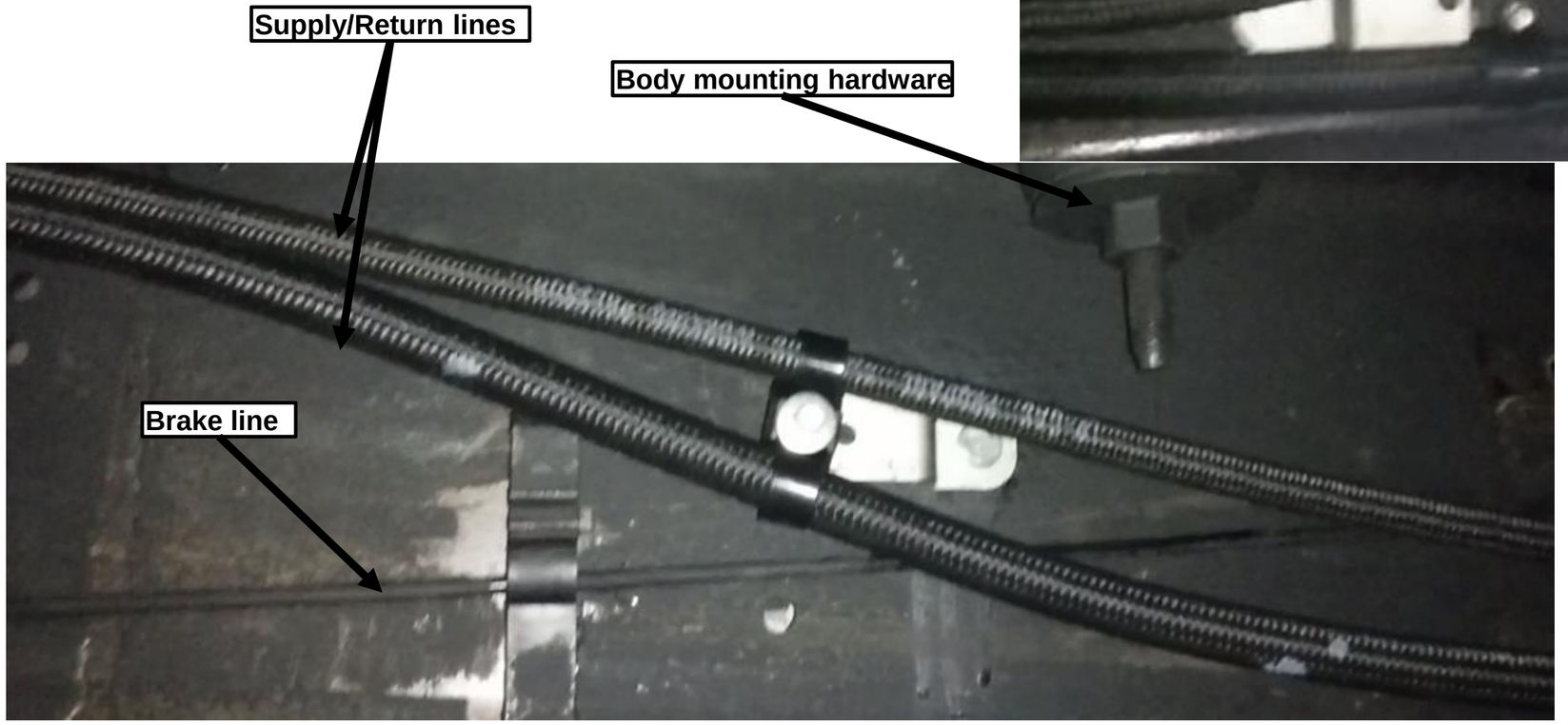
1. **Attach bracket, bolt/nuts and dual clamp zip tie to supply and return lines every 12 inches along frame**
2. **If necessary, drill 9/32” hole in frame to mount bracket(s) (P16JC-10F100-C)**
3. **Keep lines min 10mm away from other components including brake lines, bolts, clips, etc**



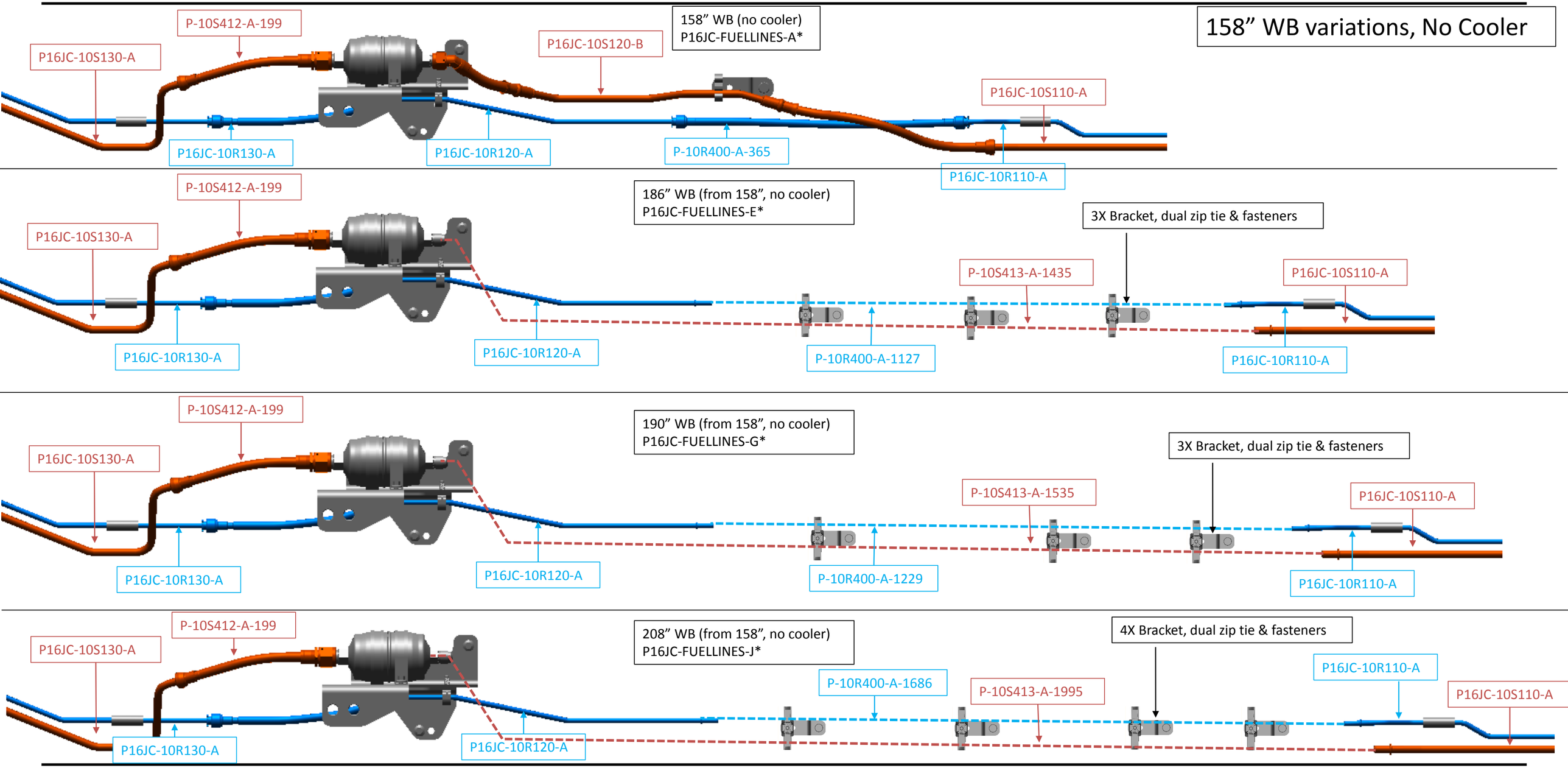
EXTENDED WHEELBASES – FUEL LINE RETENTION

Below are examples of line retention using included hardware to avoid brake line and body mounting hardware



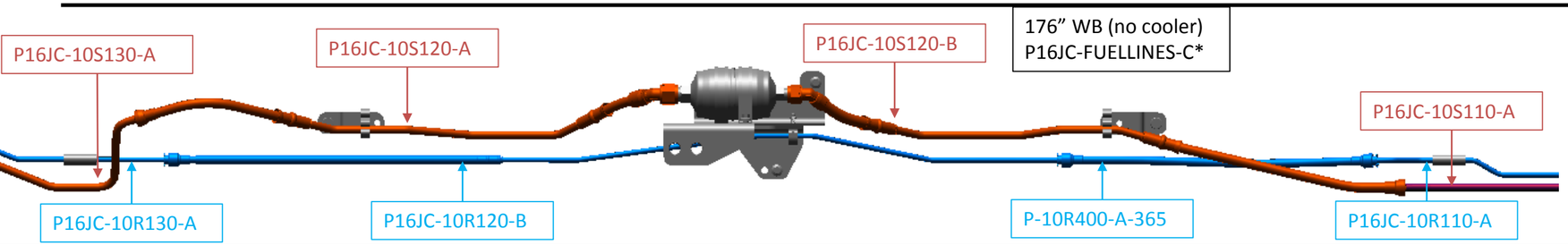


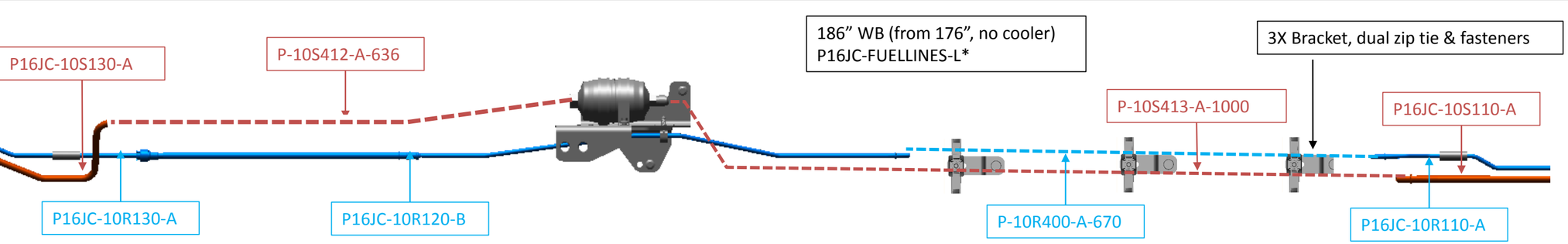
ROUSH CleanTech Liquid Propane Autogas Fuel System: E-450/E-350 Dual Rear Wheel Cutaway and Stripped Chassis

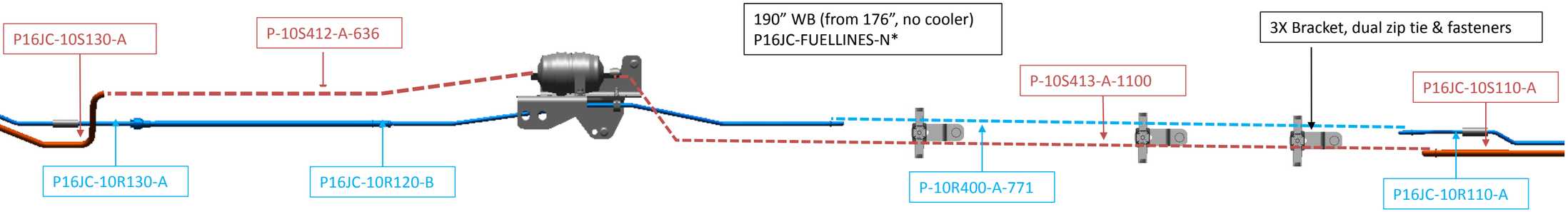


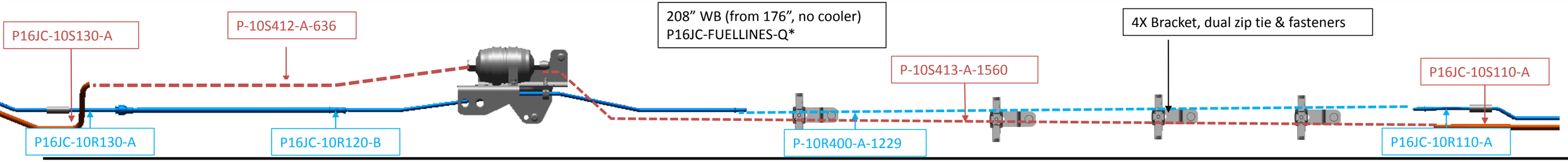
ROUSH CleanTech Liquid Propane Autogas Fuel System: E-450/E-350 Dual Rear Wheel Cutaway and Stripped Chassis

176” WB variations, No Cooler

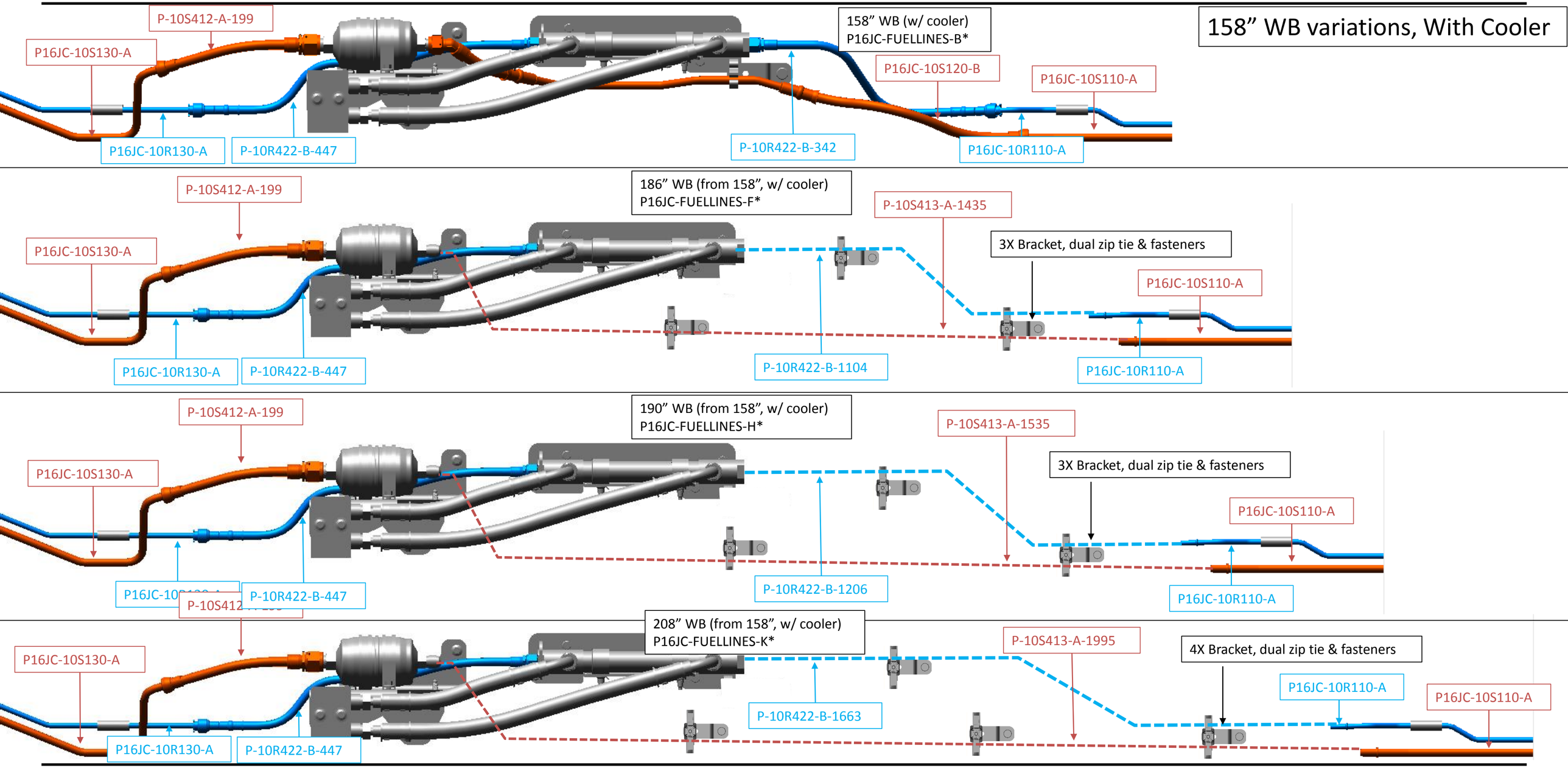






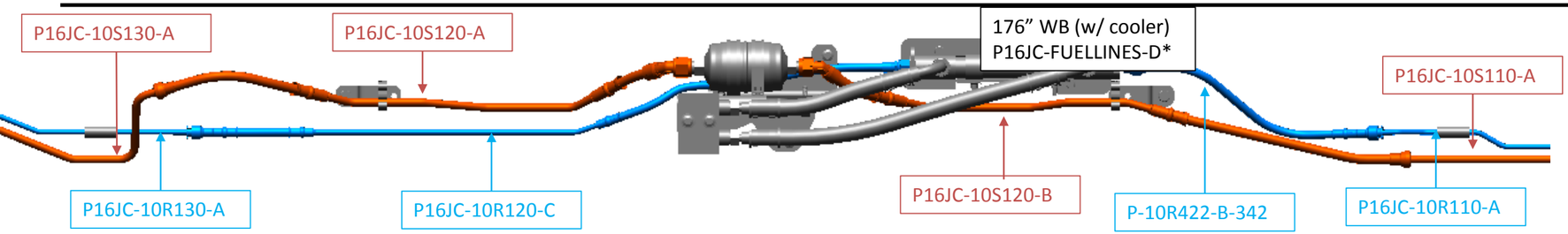


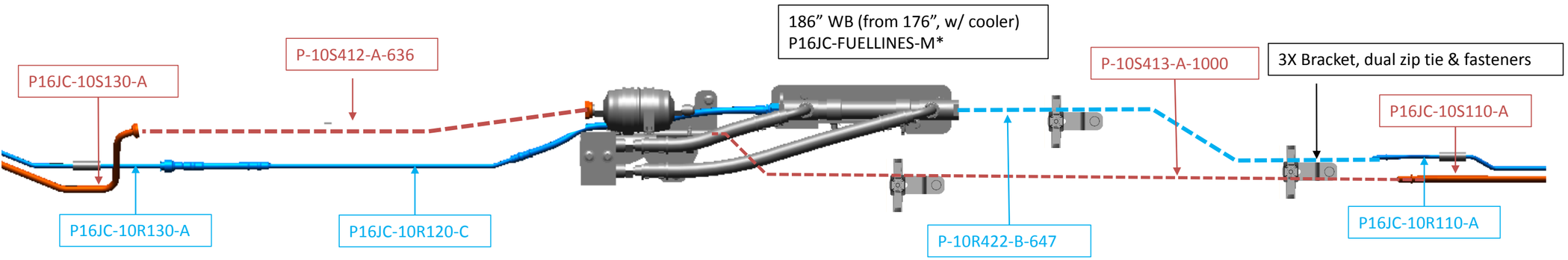
ROUSH CleanTech Liquid Propane Autogas Fuel System: E-450/E-350 Dual Rear Wheel Cutaway and Stripped Chassis

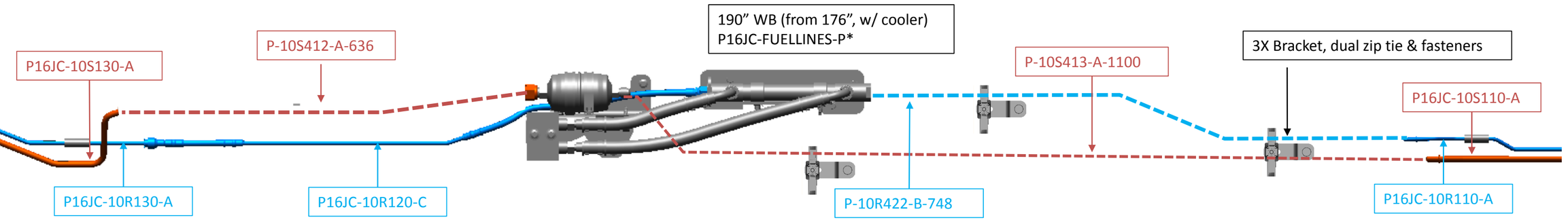


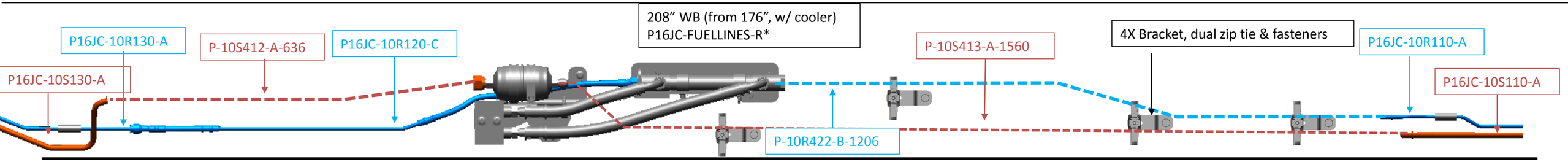
ROUSH CleanTech Liquid Propane Autogas Fuel System: E-450/E-350 Dual Rear Wheel Cutaway and Stripped Chassis

176” WB variations, With Cooler



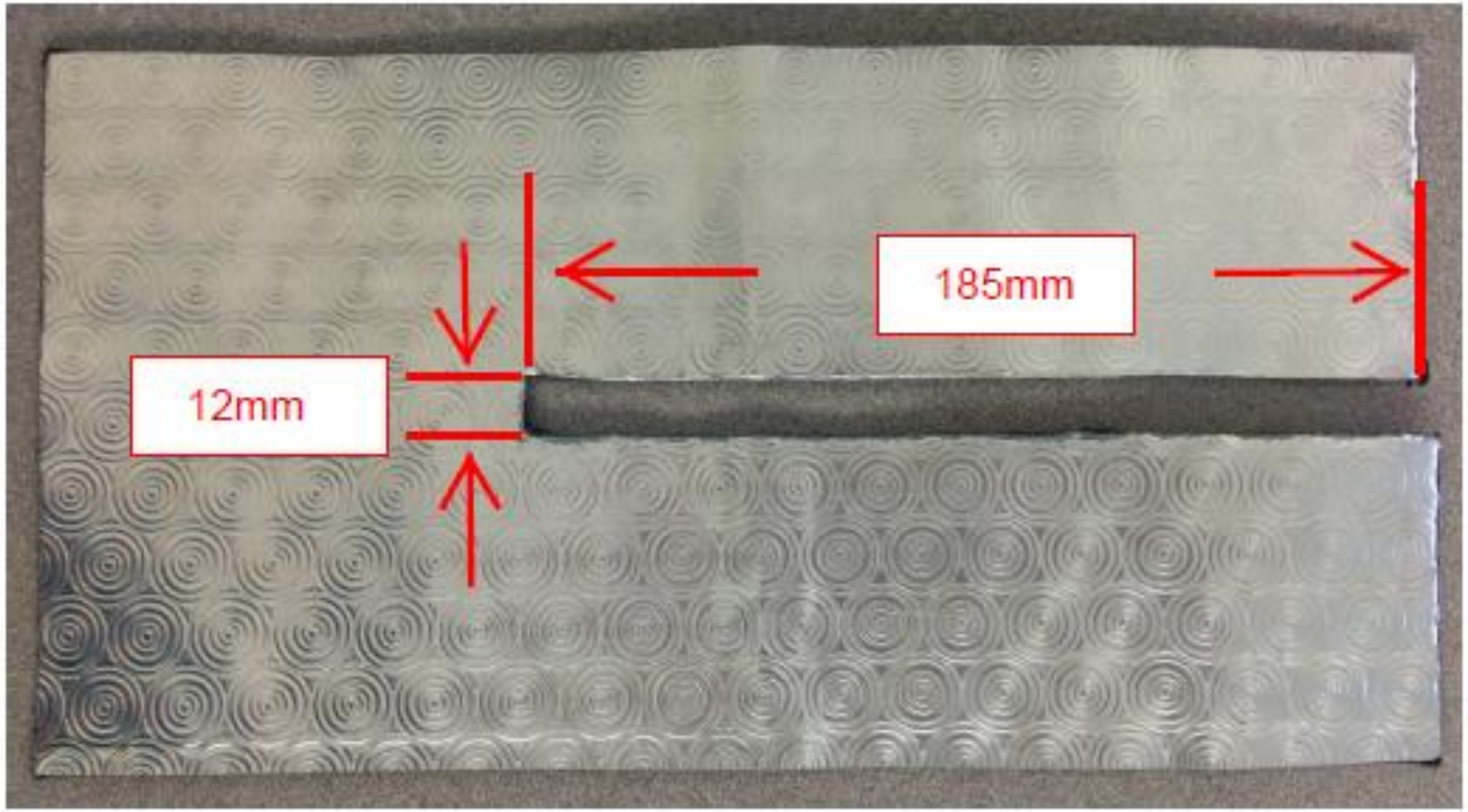






INSTALL EXHAUST HEAT SHIELD ON VEHICLE

1. Cut slit in exhaust heat shield (P16JC-15B100-A)
2. Install heat shield to exhaust pipe near front RH tank mounting location



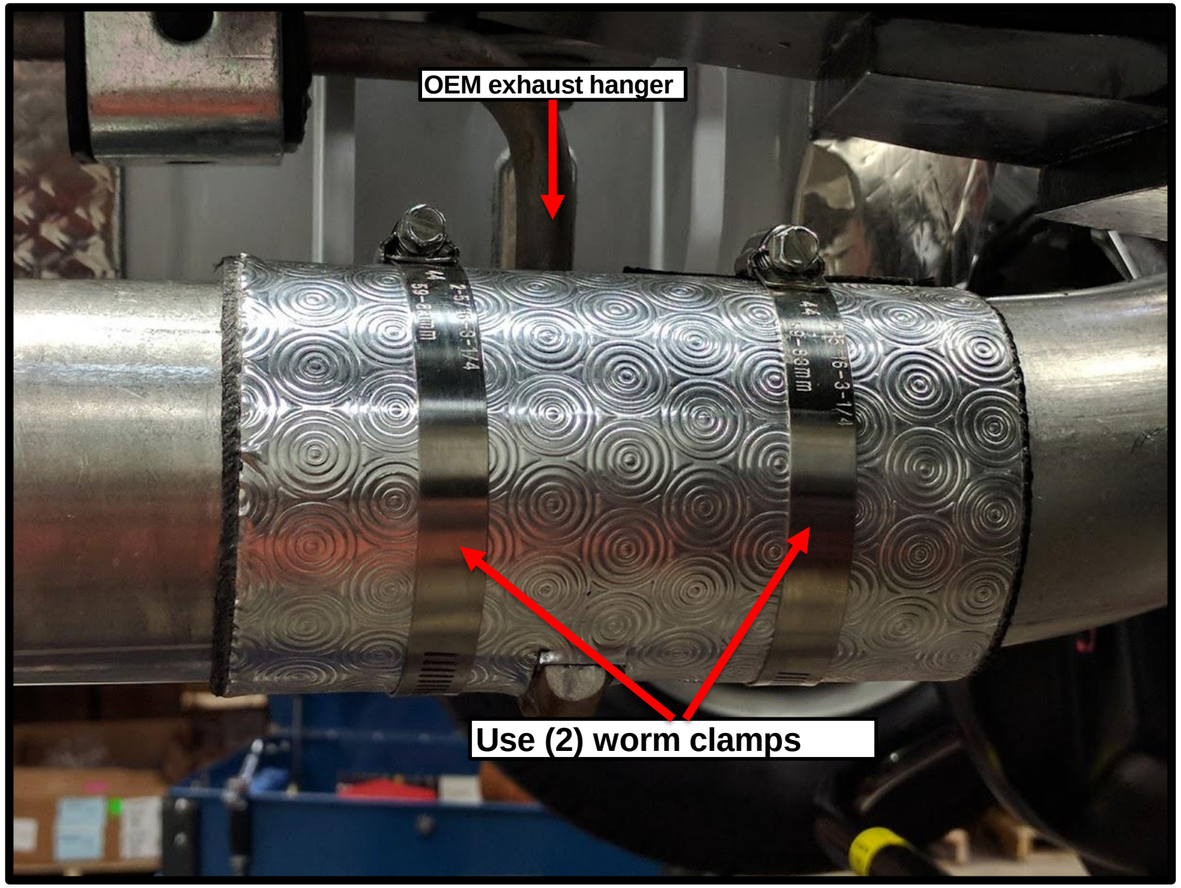
Find hardware in P16JC-TANKMNT-A

INSTALL EXHAUST HEAT SHIELD ON VEHICLE

1. Install heat shield to exhaust pipe near front RH tank mounting location

INSTALL EXHAUST HEAT SHIELD ON VEHICLE

1. Wrap heat shield around exhaust hangar and tighten with stainless steel worm clamps (11-054-0170).
Torque to 5-6 Nm



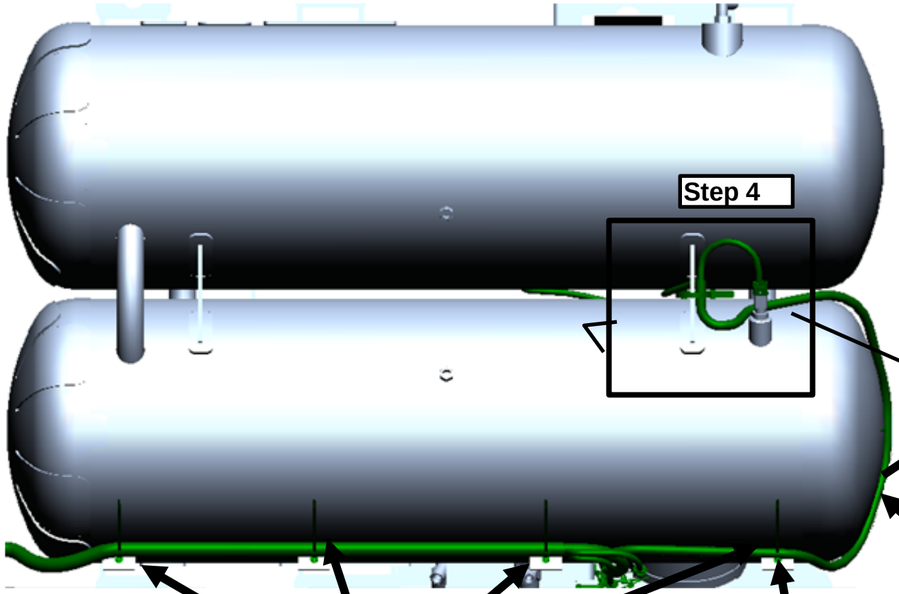
Find hardware in P16JC-TANKMNT-A/B/C/D

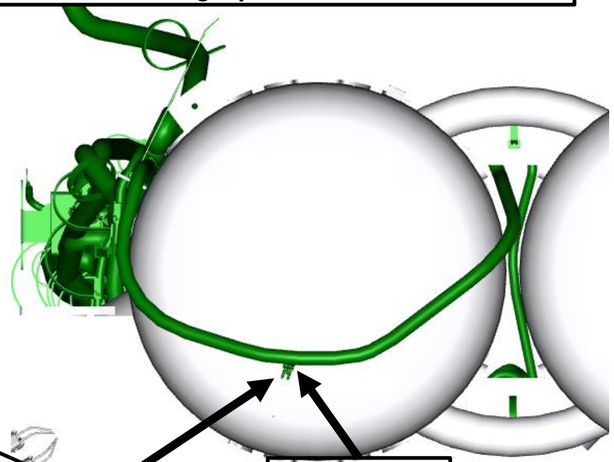
CONNECT THE TANK HARNESS TO TANK (Standard and Extended Range Tanks)

1.Route the tank harness as shown and connect to supply and return solenoids and to the in tank harness.
    1.Note: Supply Valve connector is black, Return Valve connector is grey
2. Connect to FPTS sensor.
3.Route the tank harness between the tank and connect to the fuel level sender. Retain harness with zip tie to tab on tank
4.Retain the tank harness to tank using zip ties.

Front of Vehicle

Tank top view

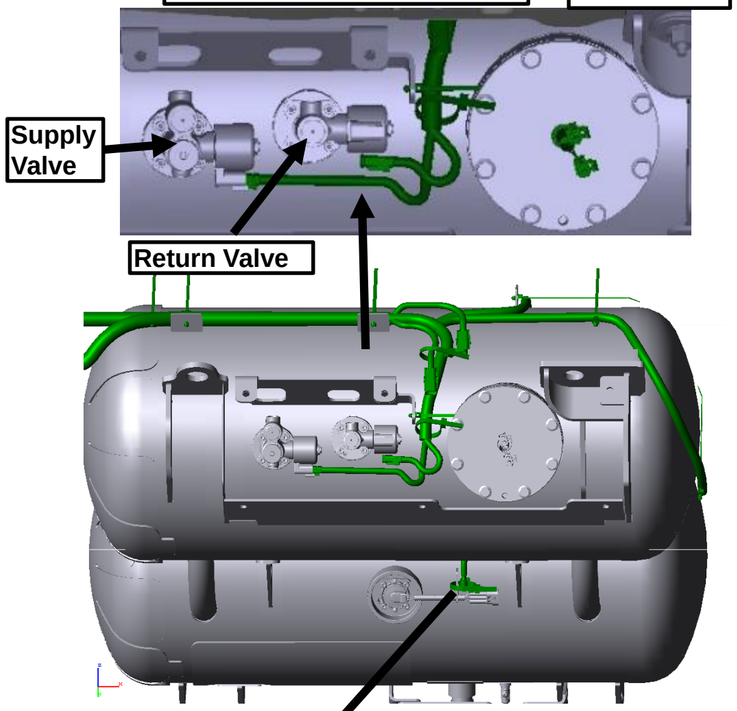


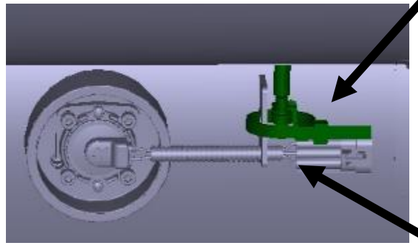


Tank Harness
P16JC-18K377-B

Tank LH frame view

Step 1 and 4

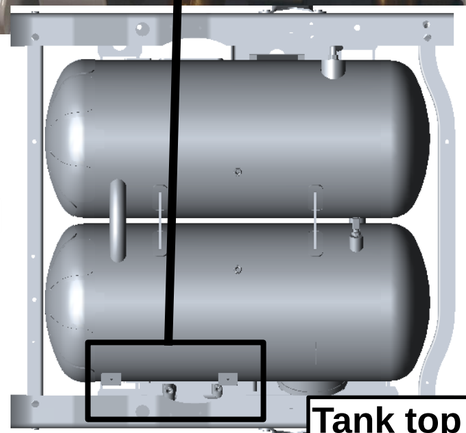




Step 3

DISCARD REUSE NEW

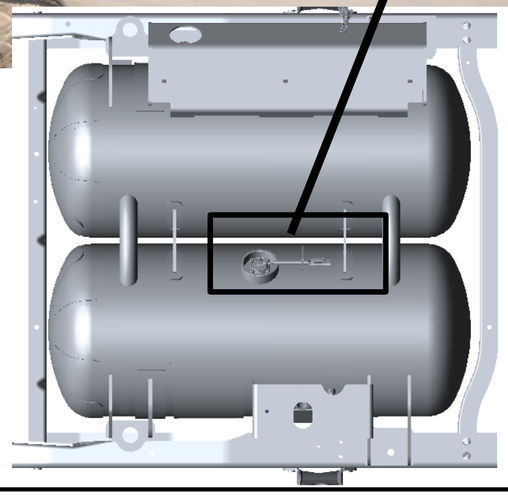
CONNECT THE TANK HARNESS TO TANK
(Standard Tank shown)



Front of Vehicle

Tank top view

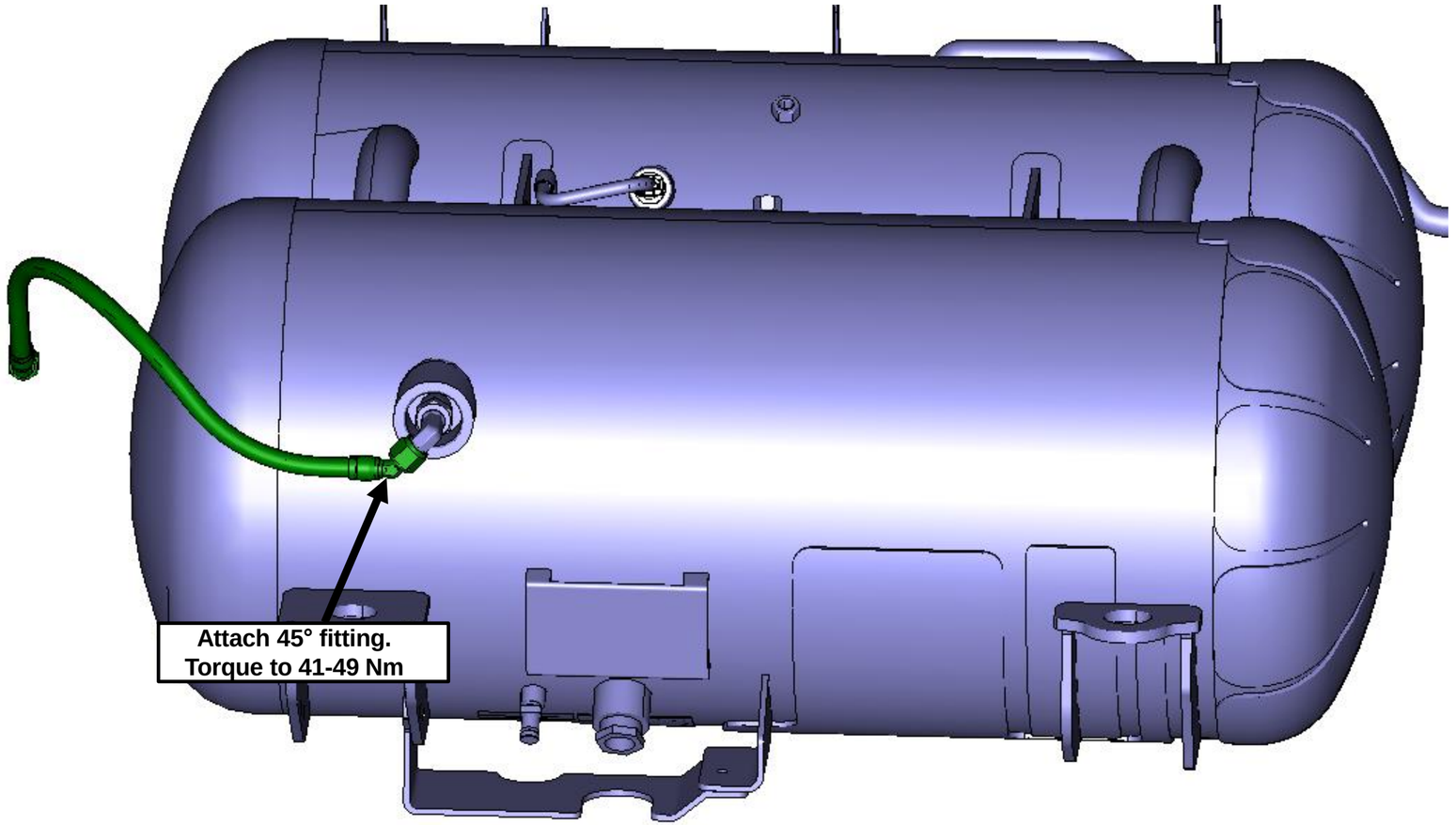
For Standard Range tank, please use (2) additional zip ties to retain extra wire harness in these two areas of the tank as shown in the photos



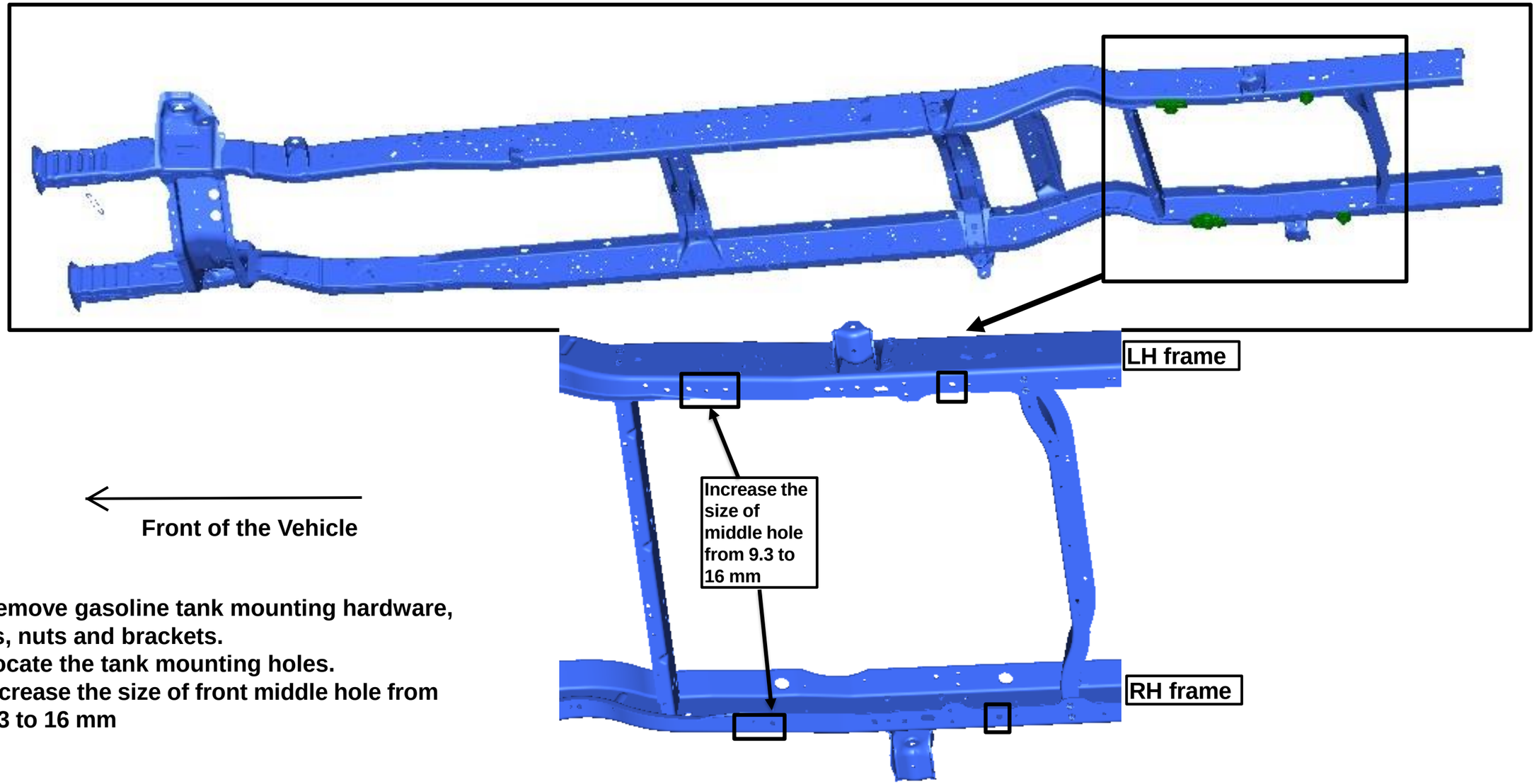
CONNECT FILL LINE TO TANK

1. Take short fill line (P-10D12X-D-XXX) and connect 45° fitting to tank OPD as shown. Torque fitting to 41-49 Nm

Do not damage this line when tank is getting decked to the frame.

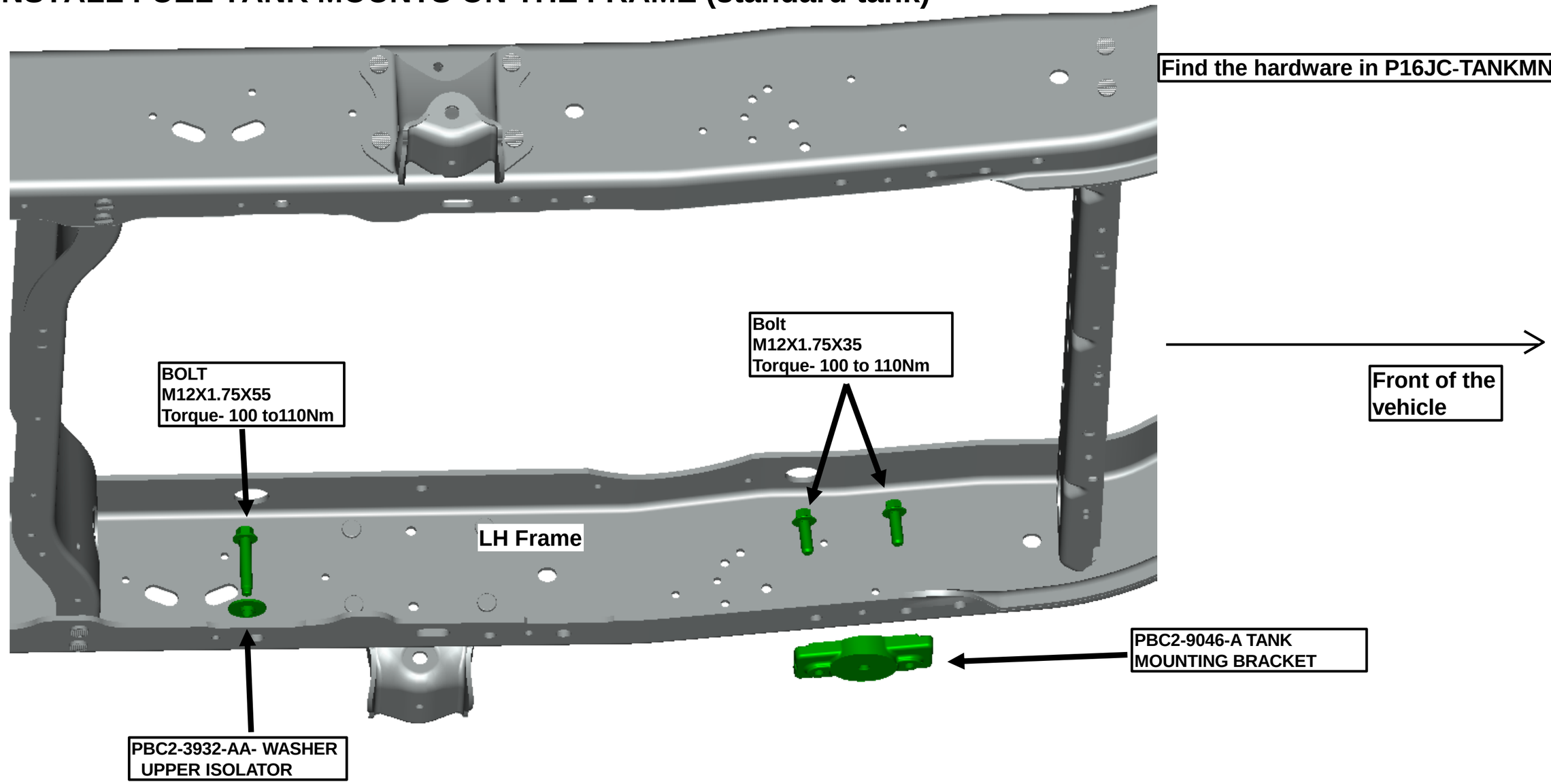


LOCATION OF TANK MOUNTS FOR BOTH 158 WB AND 176 WB (standard tank)



1. Remove gasoline tank mounting hardware, bolts, nuts and brackets.
2. Locate the tank mounting holes.
3. Increase the size of front middle hole from 9.3 to 16 mm

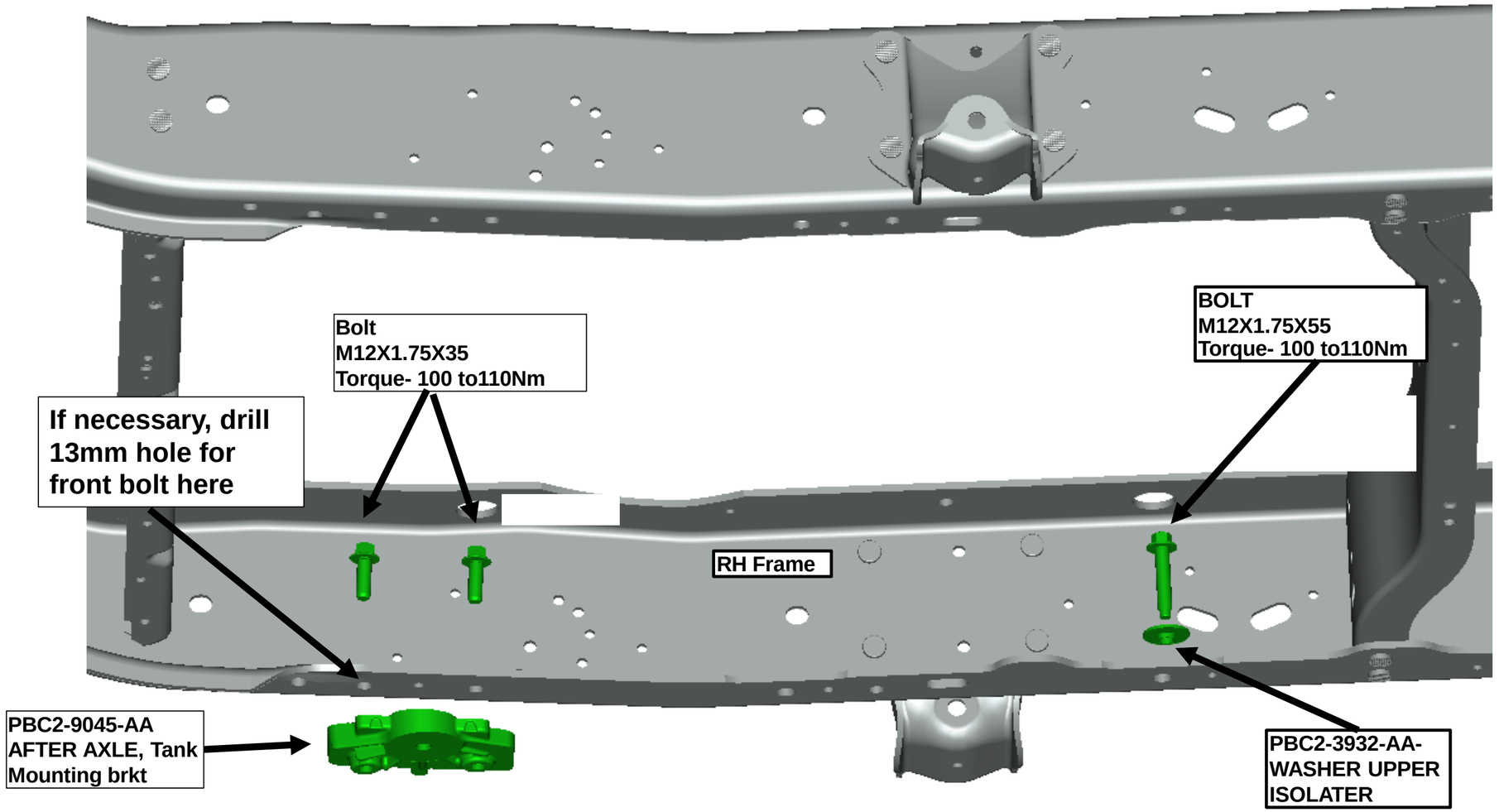
INSTALL FUEL TANK MOUNTS ON THE FRAME (standard tank)



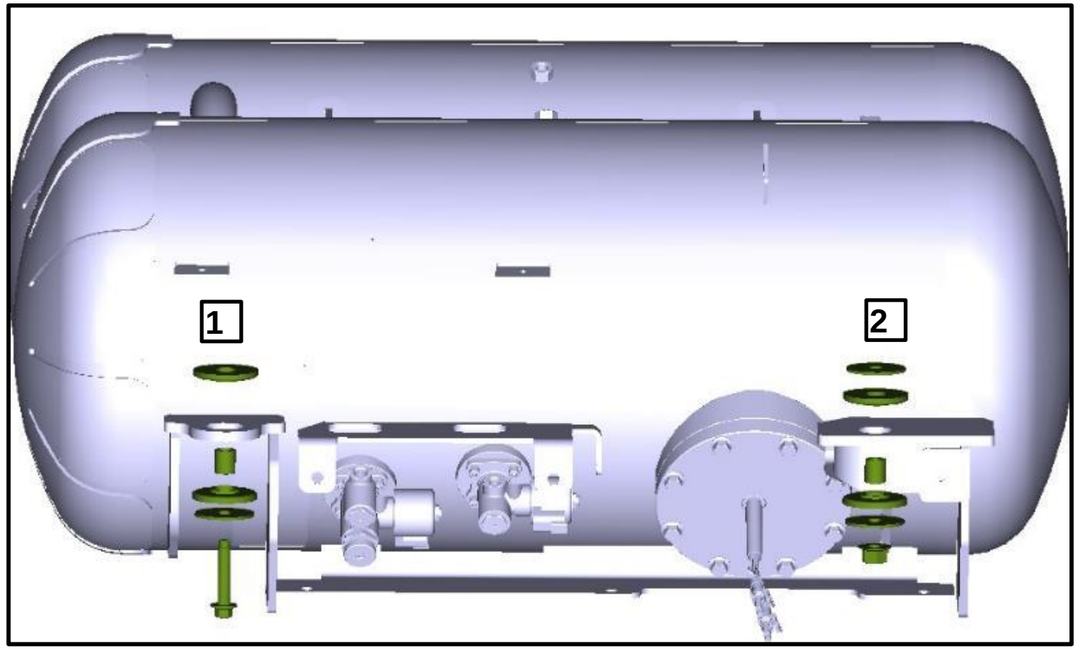
INSTALL FUEL TANK MOUNTS ON THE FRAME (standard tank)

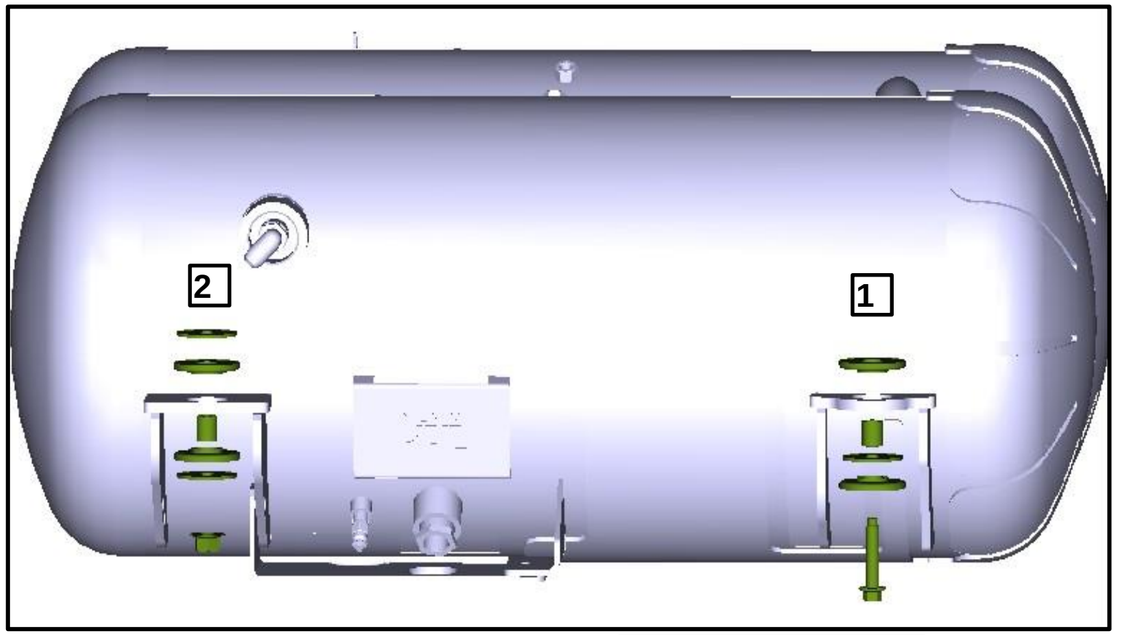
Front of the Vehicle

Find the hardware in P16JC-TANKMNT-A

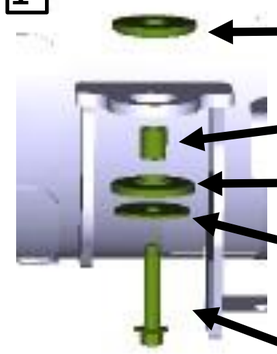


INSTALL FUEL TANK MOUNTS TO THE FUEL TANK (standard tank)



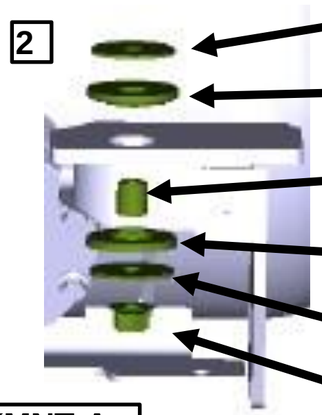


1



- P07L3-9N052-AA VIBRATION ISOLATOR
- PBC2-11293-AB ISOLATOR CRUSH LIMITER
- P07L3-9N052-AA VIBRATION ISOLATOR
- P07L3-3932-AB- WASHER UPPER ISOLATOR
- W709906-S M12X1.75X55 BOLT

2



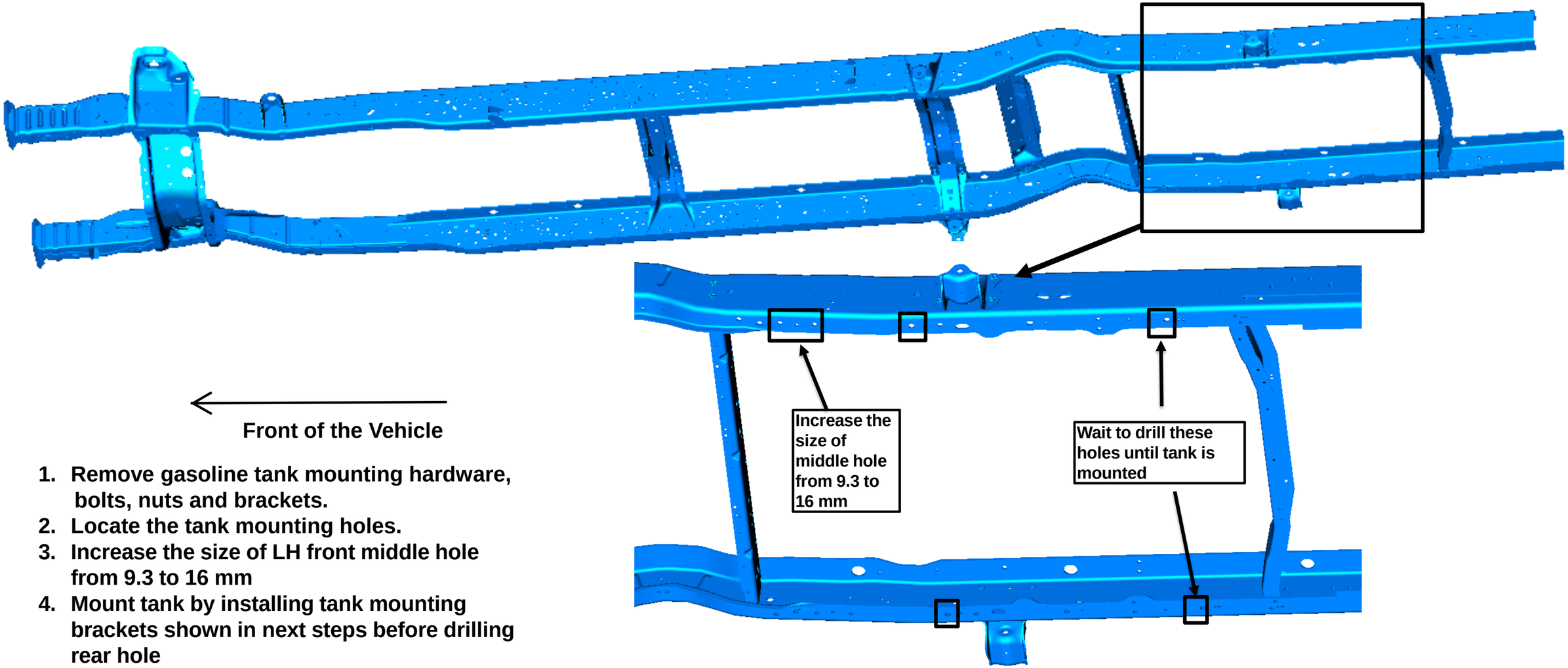
- P07L3-3932-AB- WASHER UPPER ISOLATOR
- P07L3-9N052-AA VIBRATION ISOLATOR
- PBC2-11293-AB ISOLATOR CRUSH LIMITER
- P07L3-9N052-AA VIBRATION ISOLATOR
- P07L3-3932-AB- WASHER UPPER ISOLATOR
- W710807 M12X1.75 NUT

Find hardware in P16JC-TANKMNT-A

DISCARD REUSE NEW

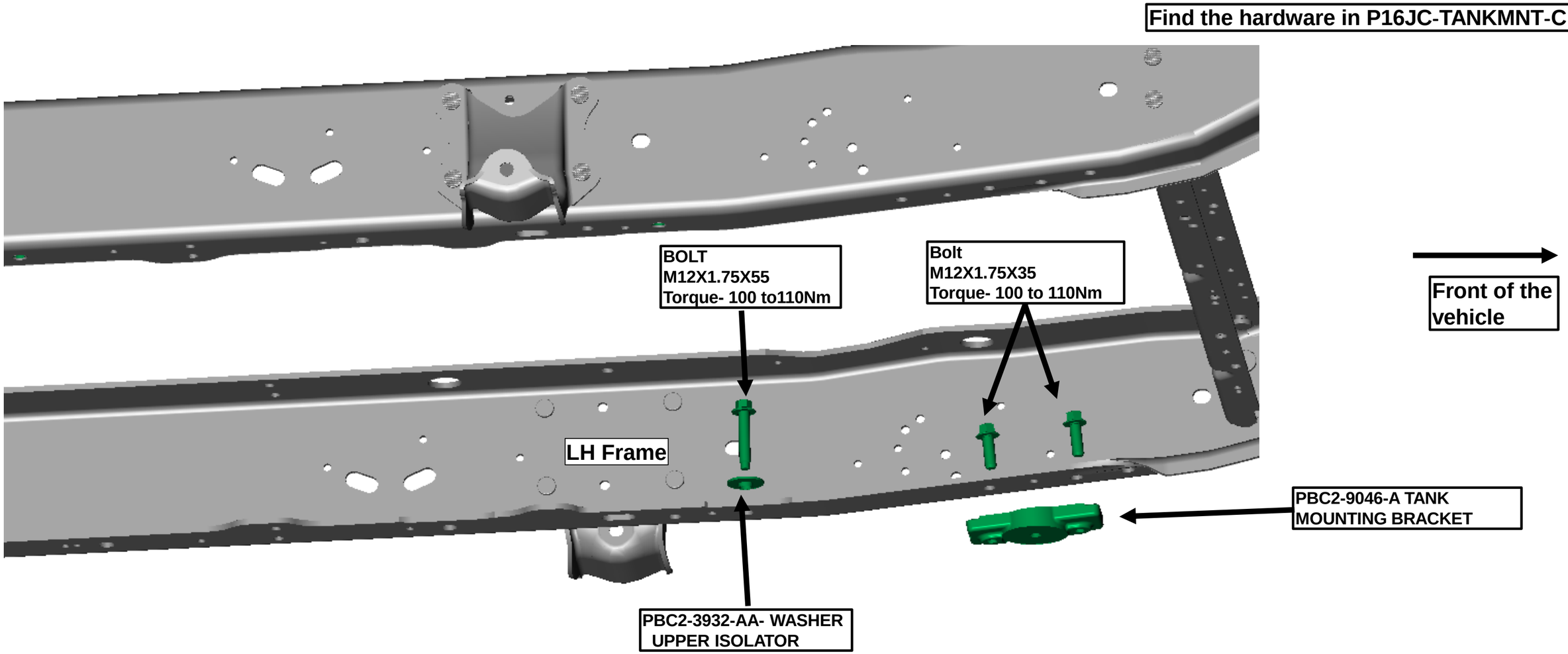
LOCATION OF TANK MOUNTS FOR BOTH 158 WB AND 176 WB (EXTENDED RANGE TANK)

Note: In order to install the extended range tank on both 158WB and 176WB, the rear crossmember must be removed and repositioned to accommodate installation of the ROUSH CleanTech fuel tank. Please refer to the Appendix at the end of this kit installation manual in *Rear Crossmember Position Modification for Fuel Tank* for instructions regarding crossmember relocation

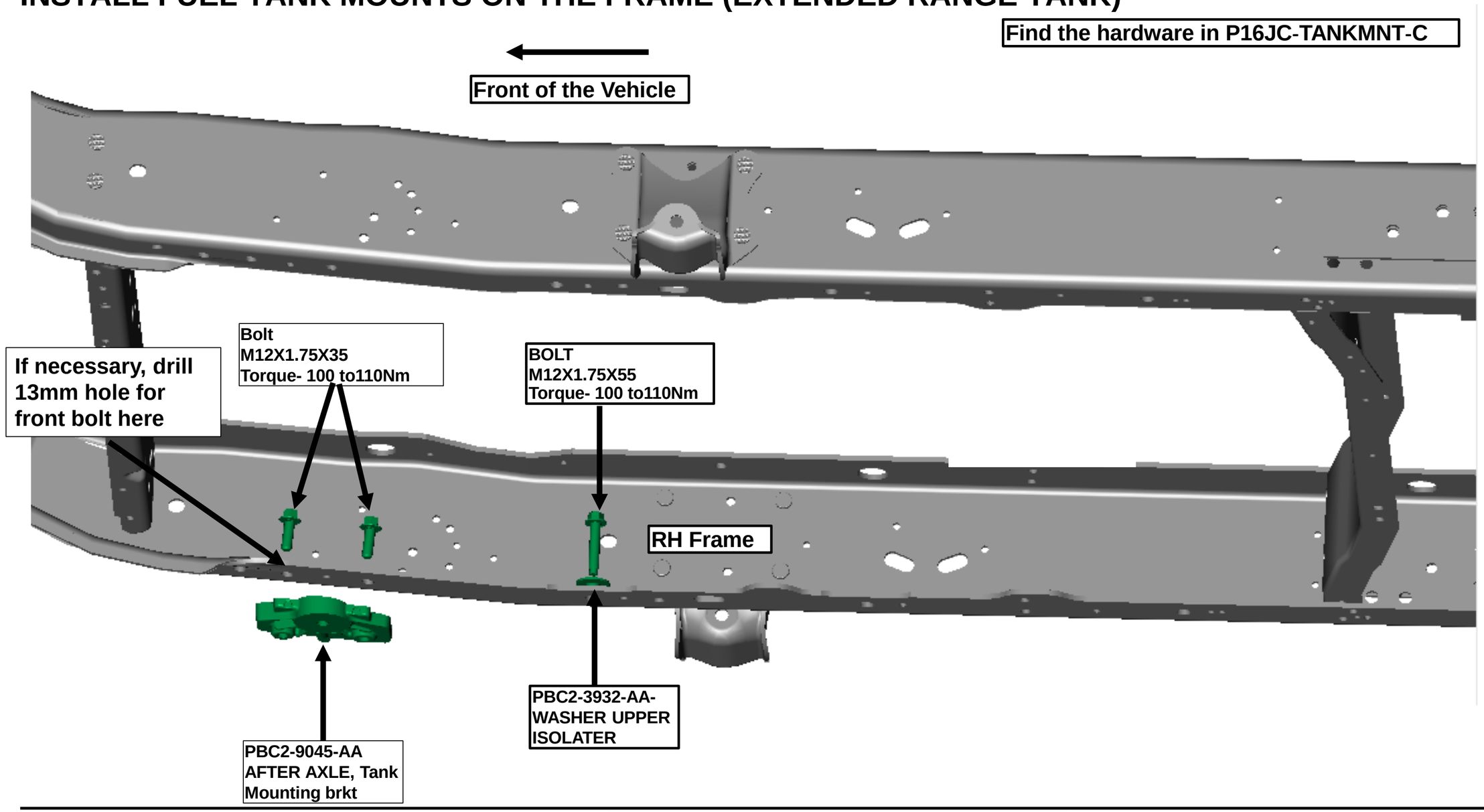


1. Remove gasoline tank mounting hardware, bolts, nuts and brackets.
2. Locate the tank mounting holes.
3. Increase the size of LH front middle hole from 9.3 to 16 mm
4. Mount tank by installing tank mounting brackets shown in next steps before drilling rear hole

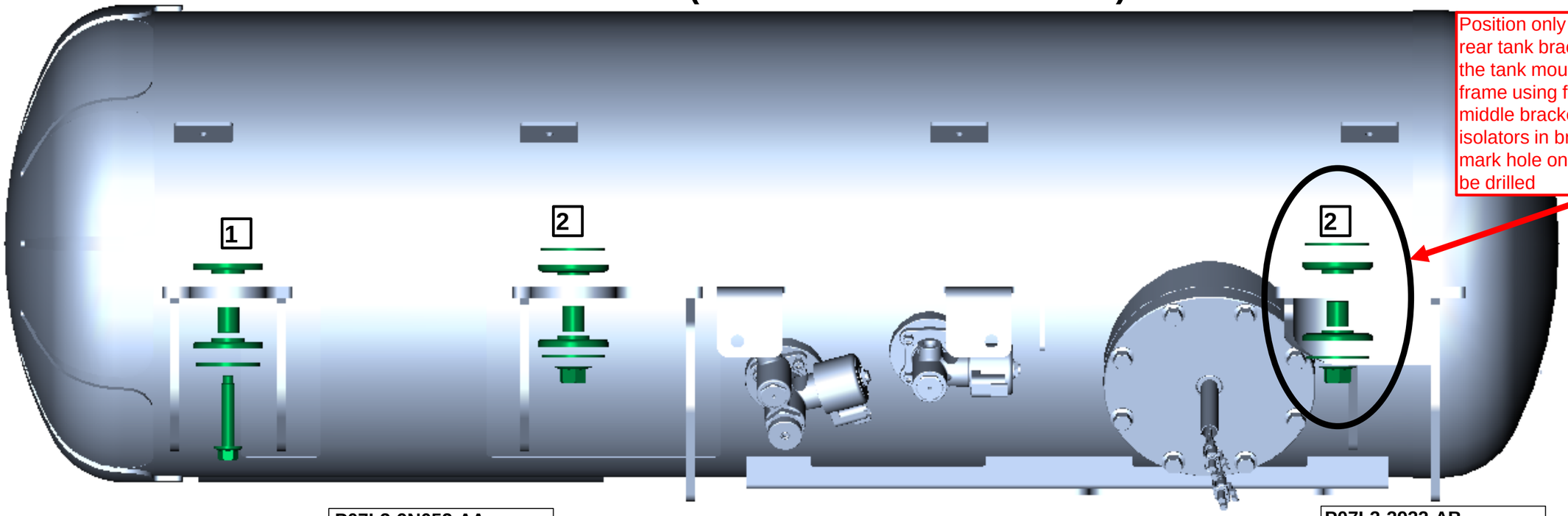
INSTALL FUEL TANK MOUNTS ON THE FRAME (EXTENDED RANGE TANK)

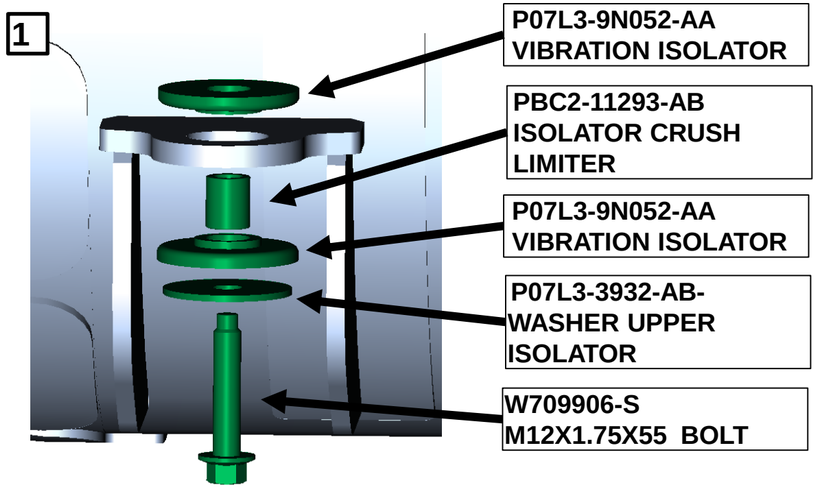


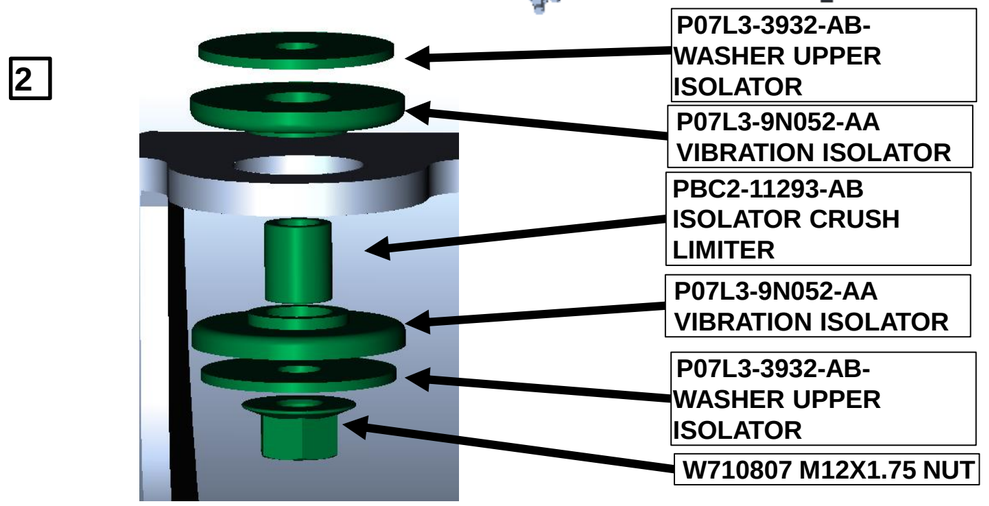
INSTALL FUEL TANK MOUNTS ON THE FRAME (EXTENDED RANGE TANK)



INSTALL FUEL TANK MOUNTS TO THE FUEL TANK (EXTENDED RANGE TANK)

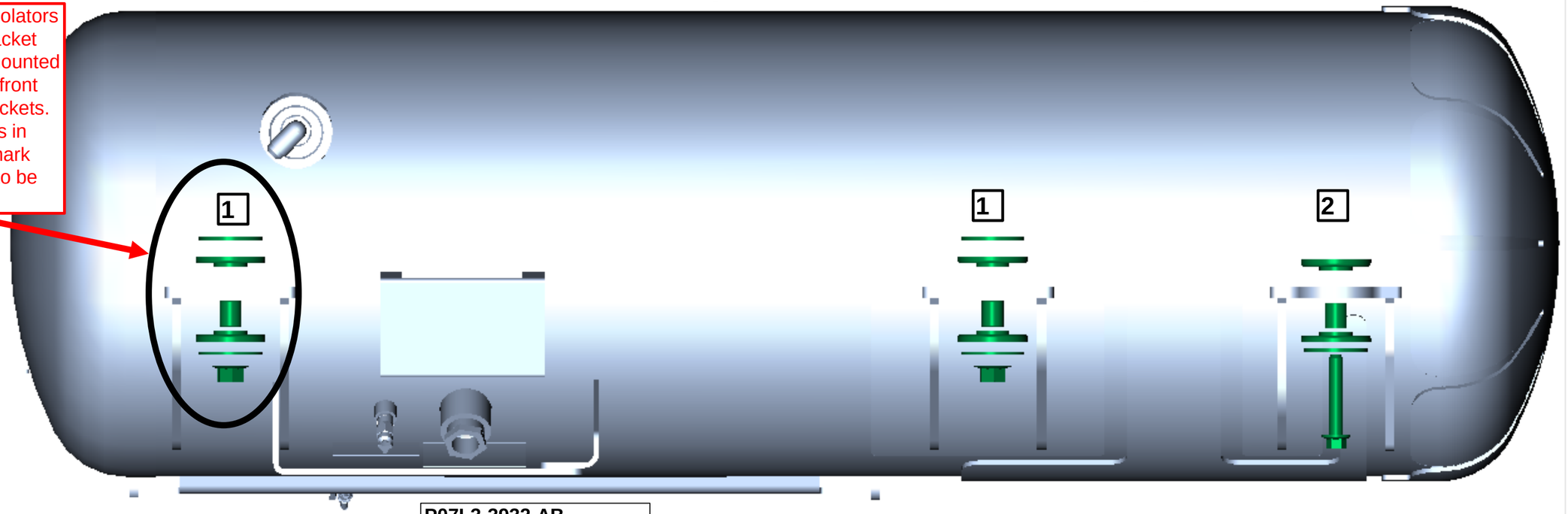




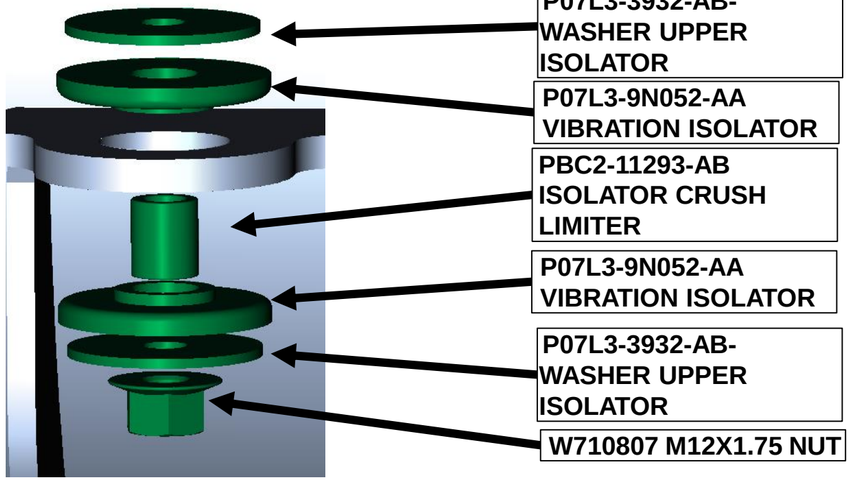


INSTALL FUEL TANK MOUNTS TO THE FUEL TANK (EXTENDED RANGE TANK)

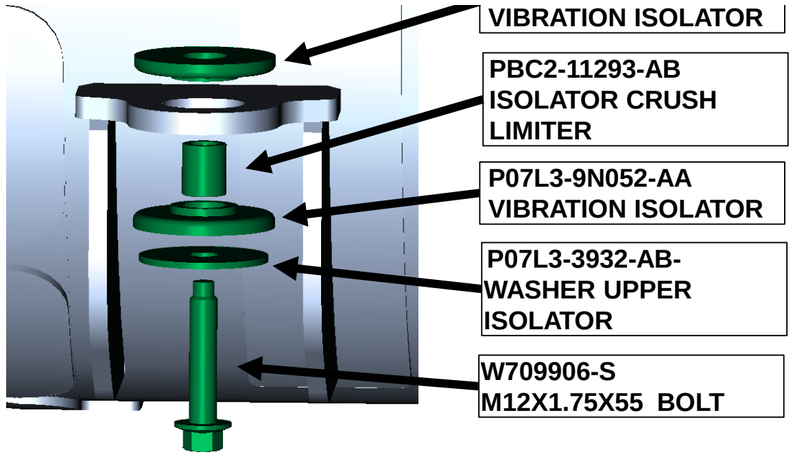
Position only isolators in rear tank bracket with the tank mounted to frame using front and middle brackets. Center isolators in brackets and mark hole on frame to be drilled



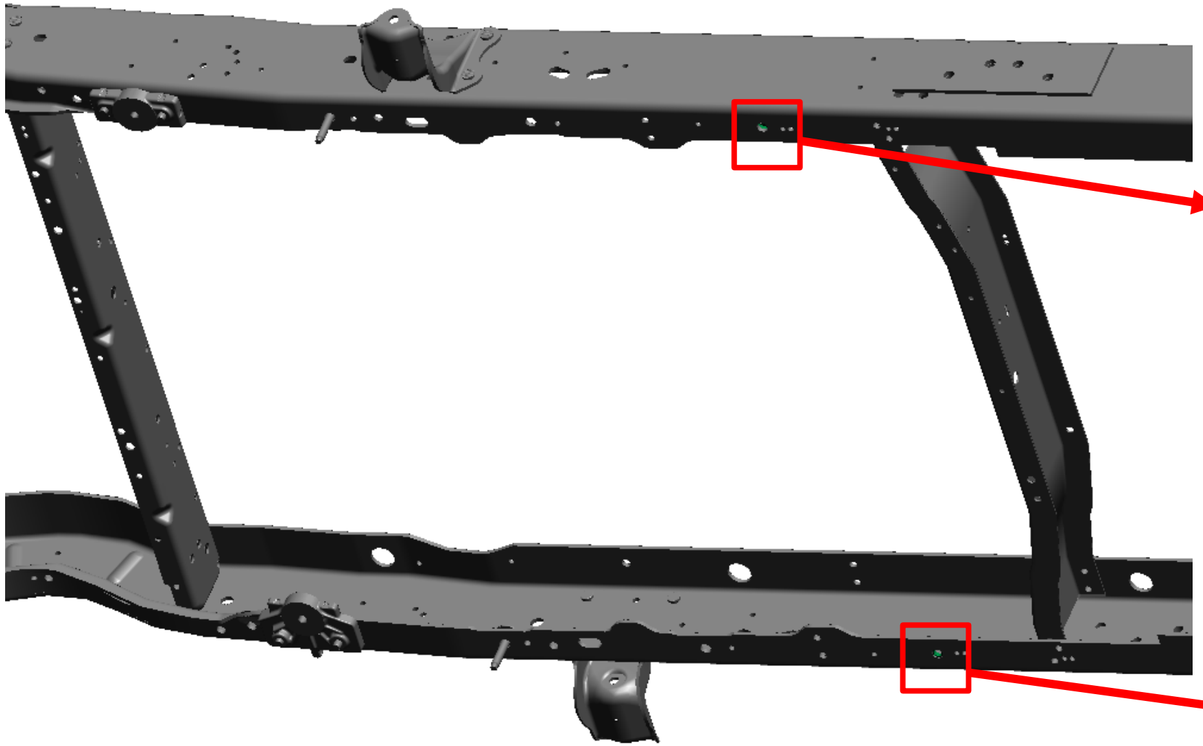
1

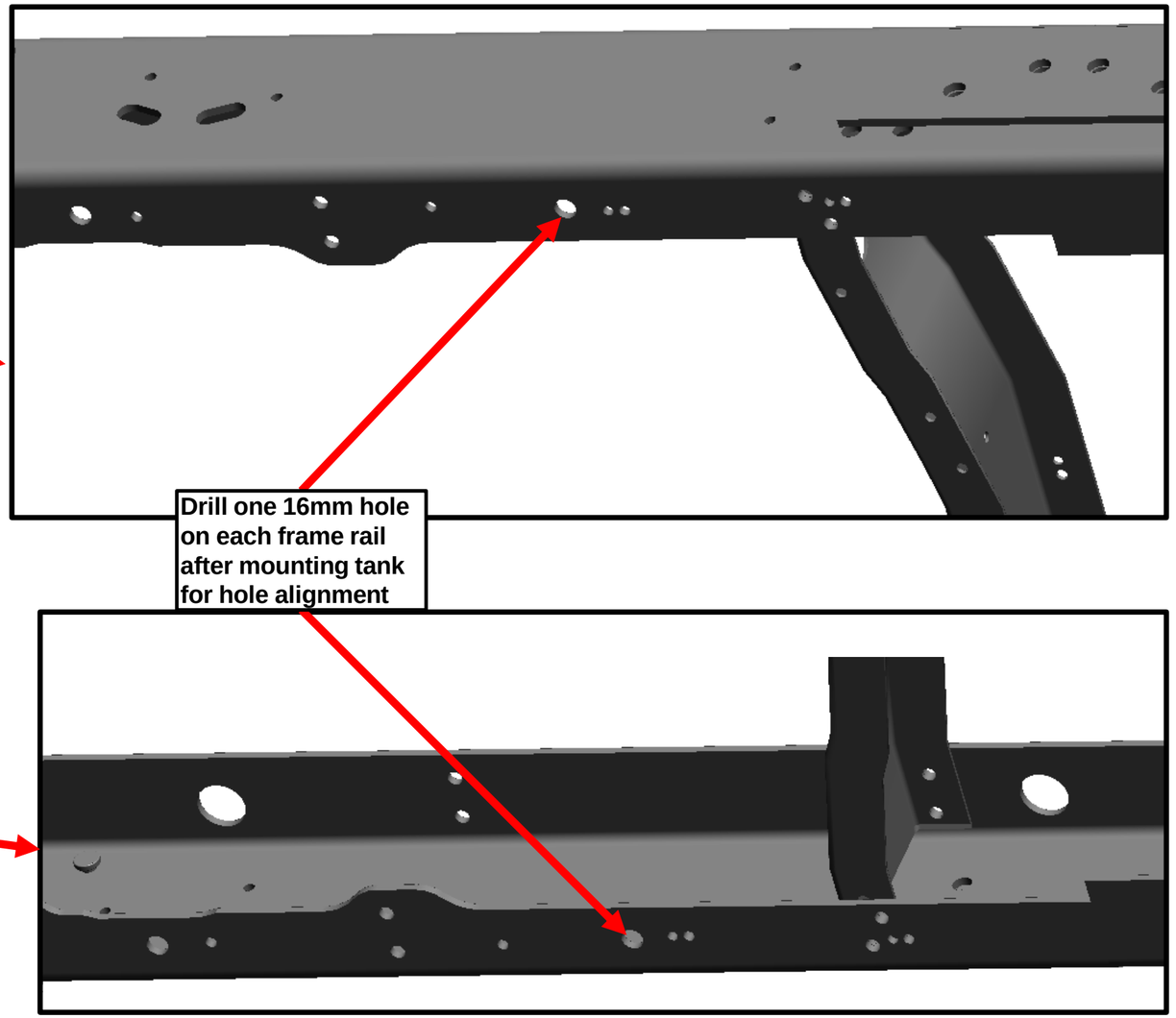


2



INSTALL FUEL TANK MOUNTS ON THE FRAME (EXTENDED RANGE TANK)



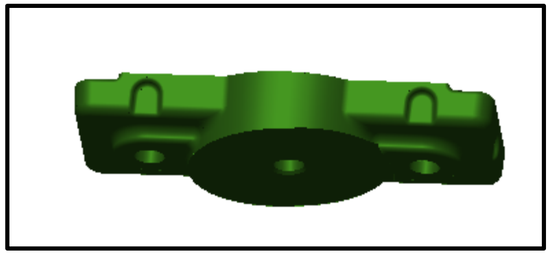


1. **With tank secured at the front and middle mounting brackets, drill 16mm hole at positions that were marked on the frame**

FUEL TANK MOUNTS (MICROBIRD)

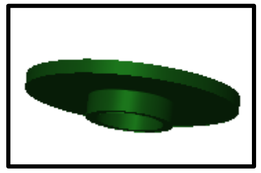
Step 1- Install PBC2-9045 A- TANK MOUNTING BRACKET and two bolts.
Step 2- Install PBC2-9046 A- TANK MOUNTING BRACKET and two bolts.
Step 3- Install M12X1.75X70 BOLT and PBC2-3932-A WASHER UPPER ISOLATOR

PBC2-9046-A



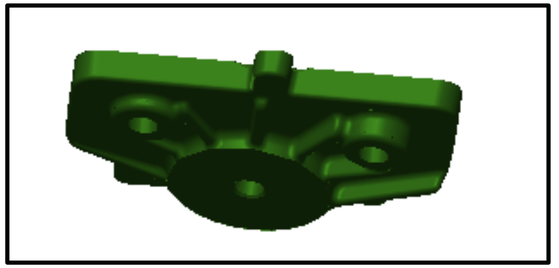
RH Frame

PBC2-3932-A



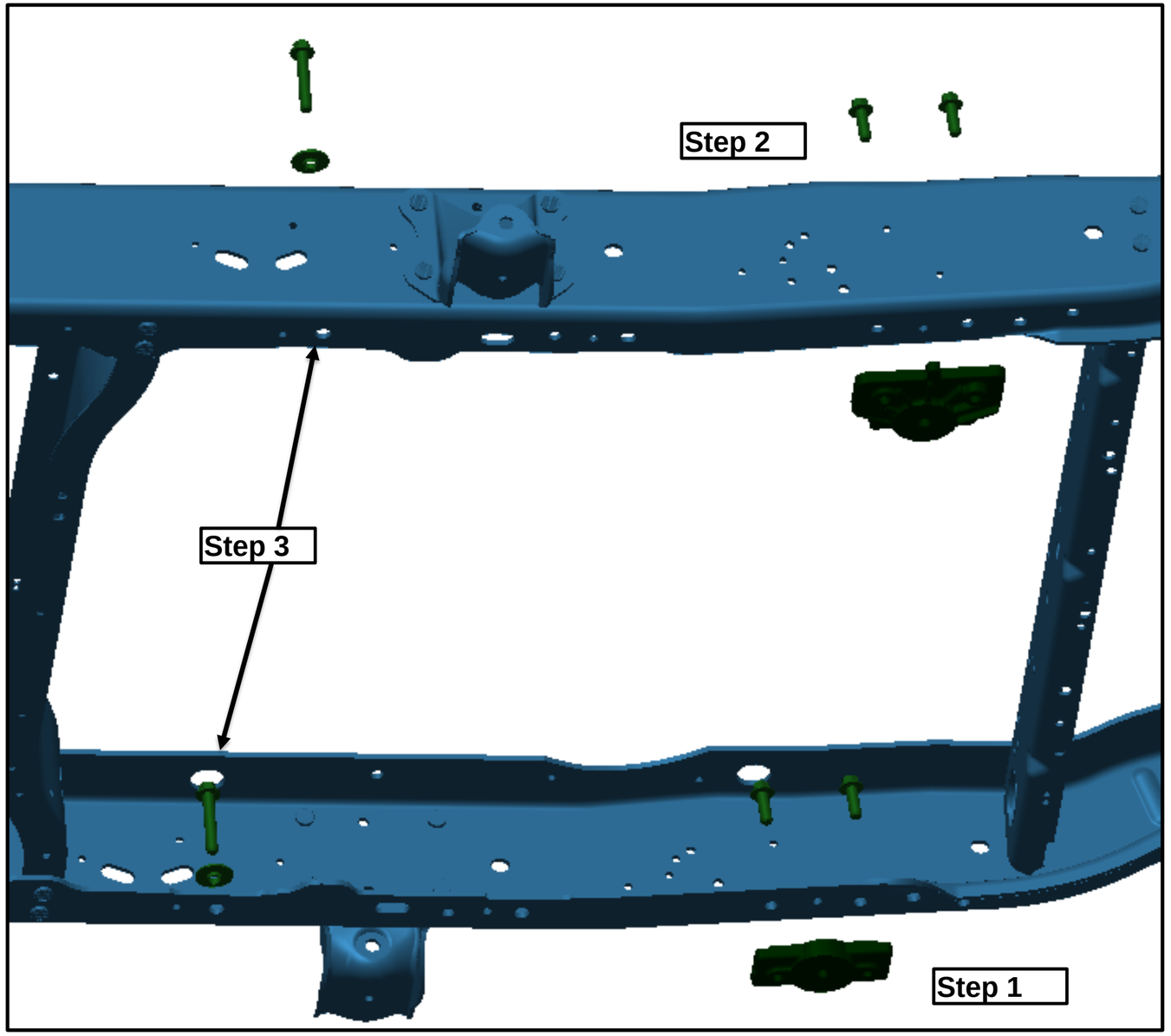
Front of the vehicle

PBC2-9045 A-

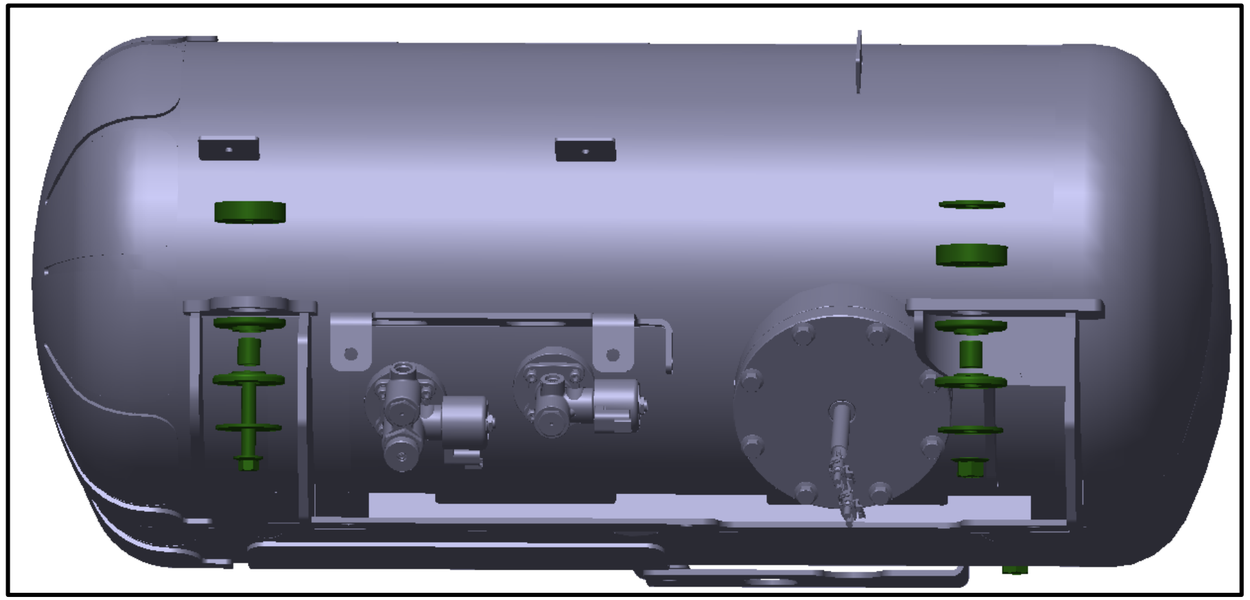


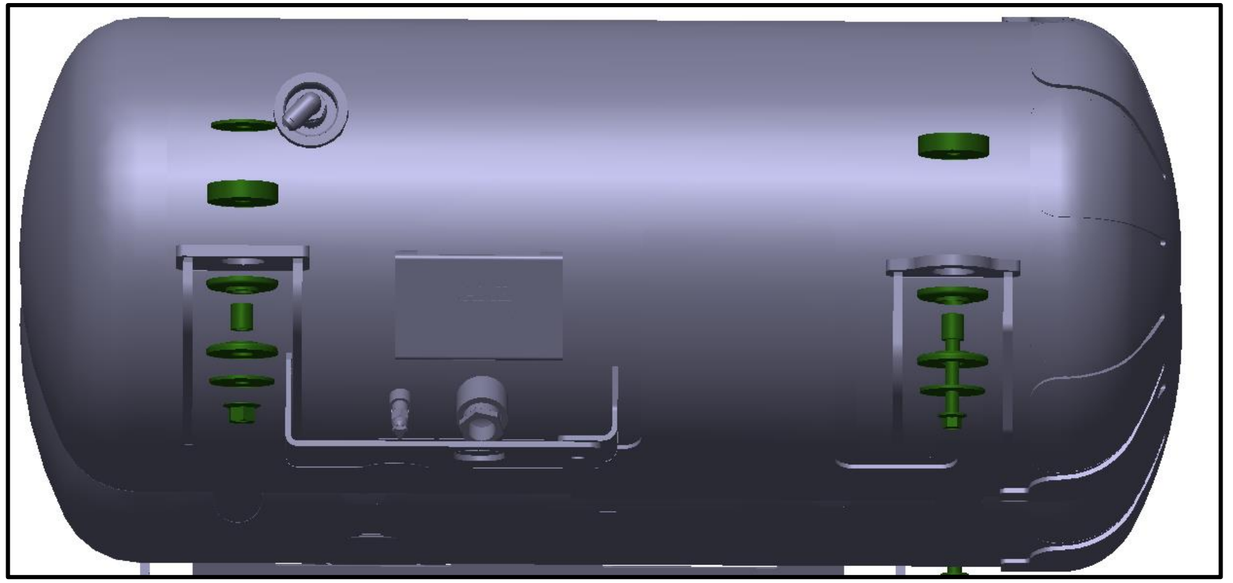
LH Frame

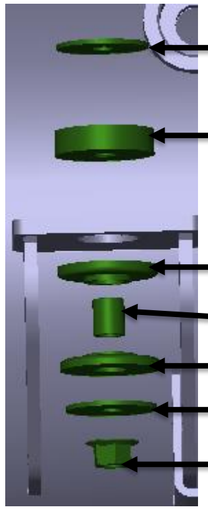
Find hardware in P16JC-TANKMNT-B



INSTALL FUEL TANK MOUNTS TO THE FUEL TANK (MICROBIRD)







P07L3-9N052-AB VIBRATION ISOLATOR

PBC2-9A083-A Tank mount spacer

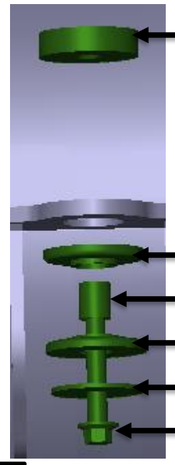
P07L3-9N052-AA VIBRATION ISOLATOR

PBC2-11293-AB ISOLATOR CRUSH LIMITER

P07L3-9N052-AA VIBRATION ISOLATOR

P07L3-3932-AB- WASHER UPPER ISOLATOR

W710807 M12X1.75 NUT



PBC2-9A083-A Tank mount spacer

P07L3-9N052-AA VIBRATION ISOLATOR

PBC2-11293-AB ISOLATOR CRUSH LIMITER

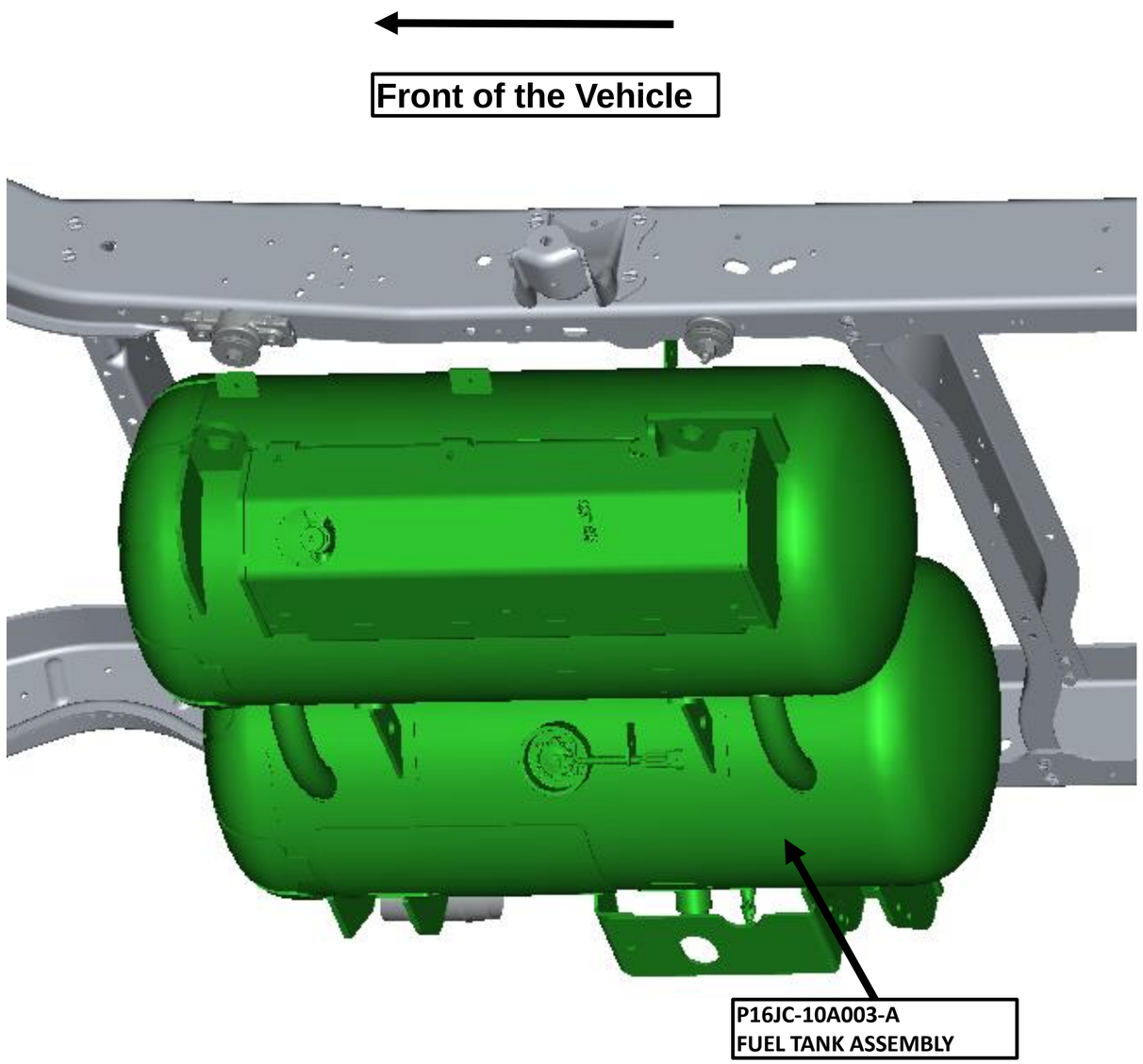
P07L3-9N052-AA VIBRATION ISOLATOR

P07L3-3932-AB- WASHER UPPER ISOLATOR.

W500745-S M12X1.75X70 BOLT

Find hardware in P16JC-TANKMNT-B

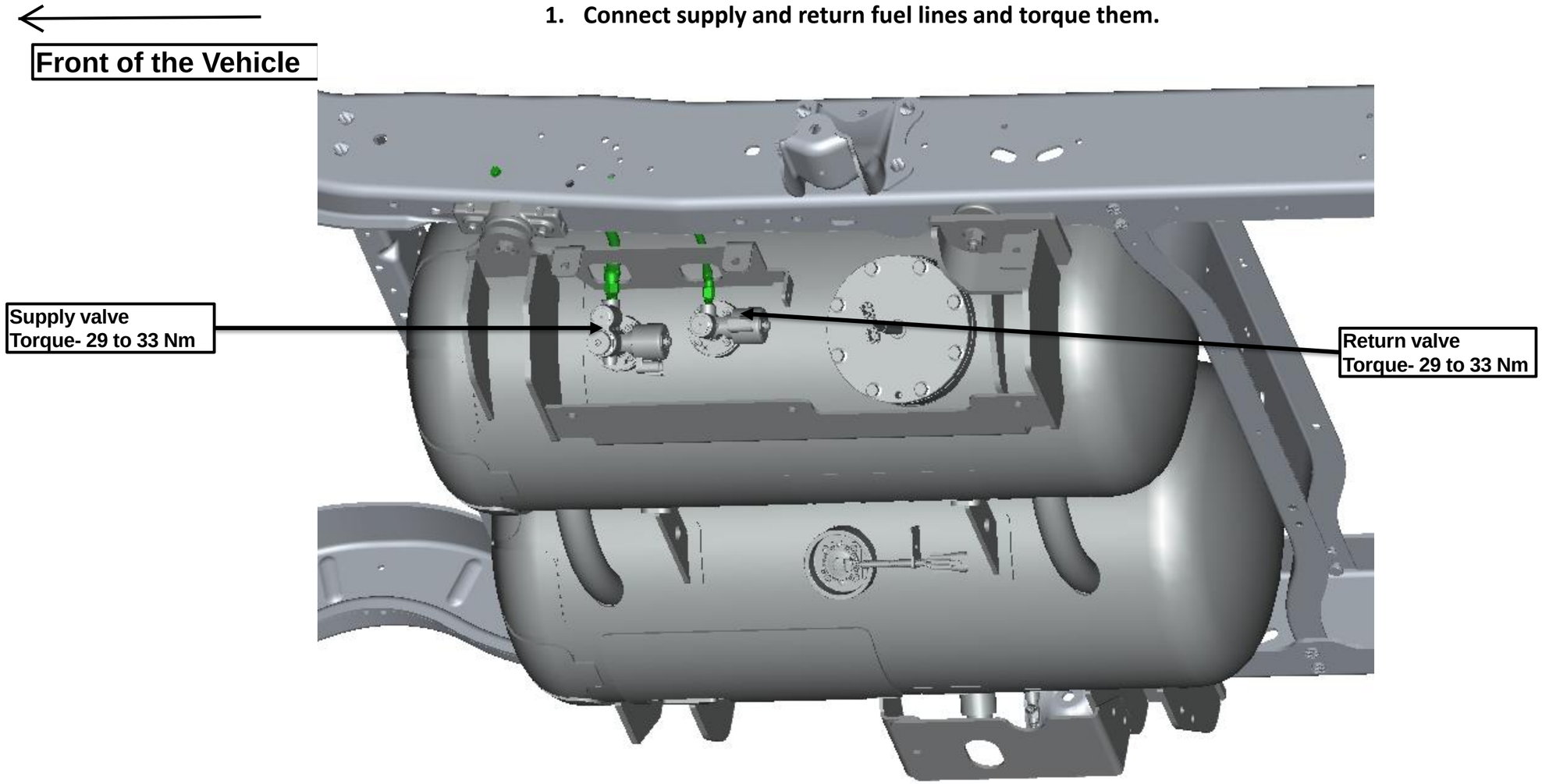
INSTALL FUEL TANK TO FRAME



1. Raise fuel tank into position against frame rails and front frame mount brackets. Leave tank slightly lowered until all bolts, washers, isolators, crush limiters and nuts are in place and started.
2. Raise tank to compress hardware against frame rails and tighten all fasteners to secure tank.
   Torque to 100-110Nm.

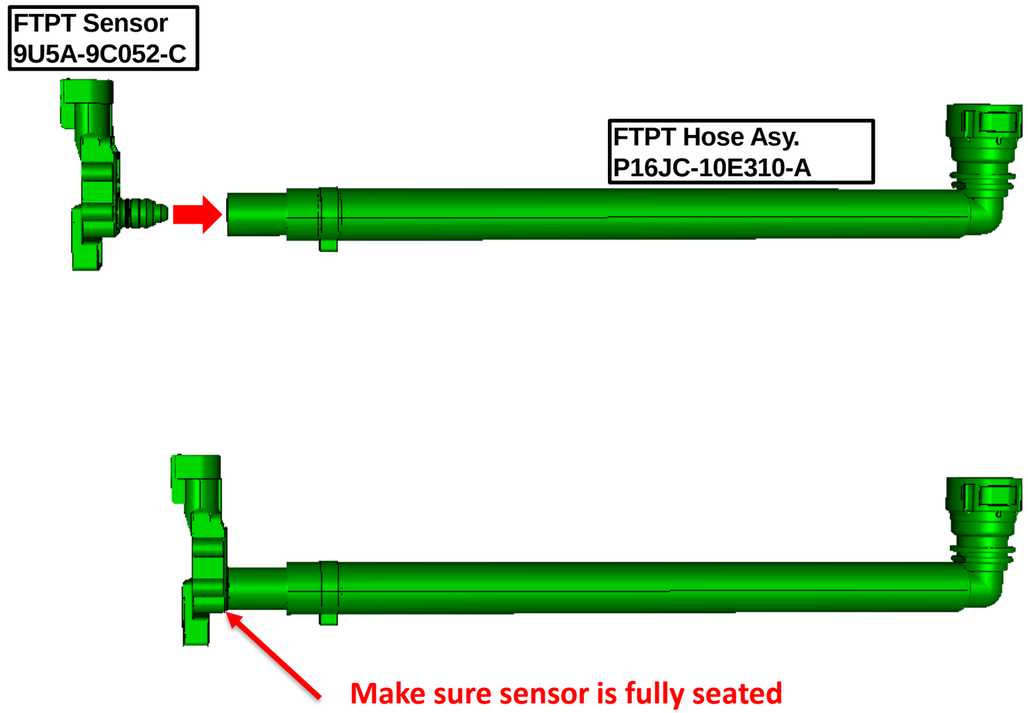
CONNECT THE FUEL LINES TO THE SUPPLY AND RETURN VALVES

1. **Connect supply and return fuel lines and torque them.**

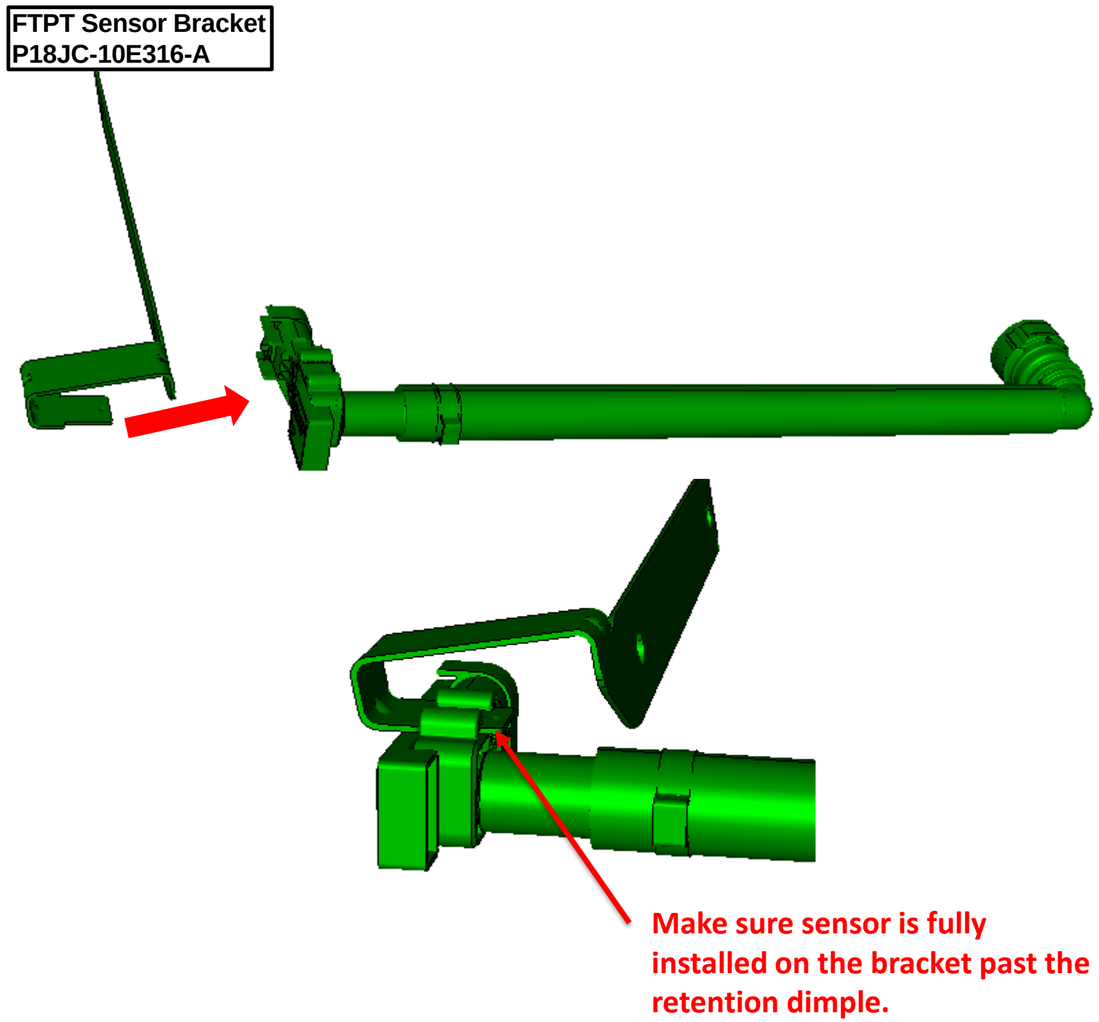


INSTALLING FTPT SENSOR, HOSE ASSEMBLY AND SENSOR BRACKET TO VAPOR CANISTER

1. **Install the FTPT sensor (9U5A-9C052-C) onto the FTPT hose assembly (P16JC-10E310-A) by inserting as shown until it is fully seated.**

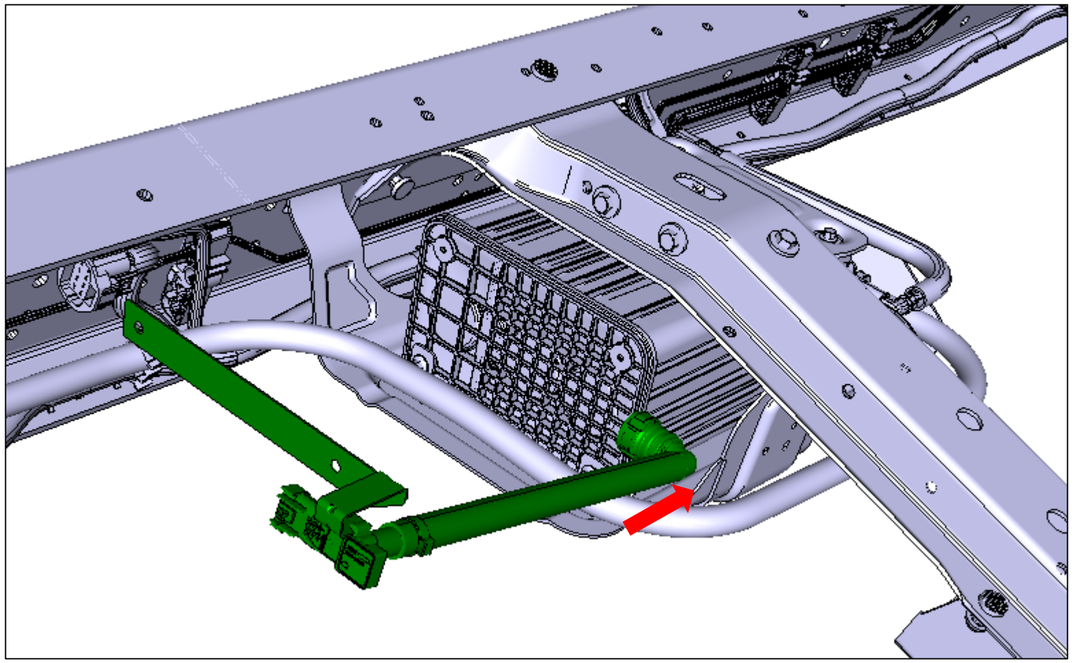


2. **Install the sensor bracket (P18JC-10E316-A) by sliding the sensor onto the bracket as shown**

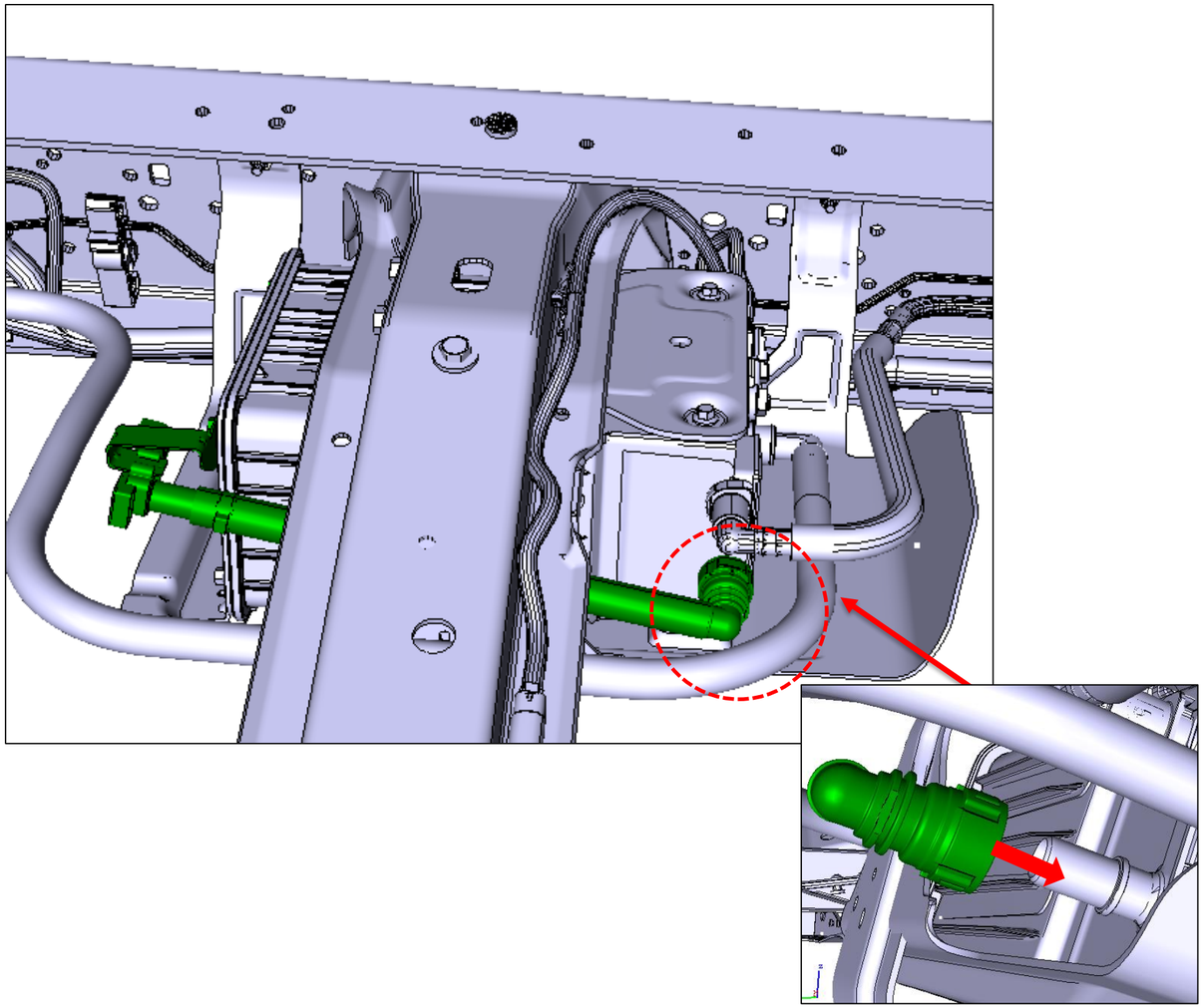


INSTALLING FTPT SENSOR, HOSE ASSEMBLY AND SENSOR BRACKET TO VAPOR CANISTER

3. **Install the FTPT sensor assembly by sliding it from the rear of the canister and in-between the vapor canister and vapor canister bracket as shown.**

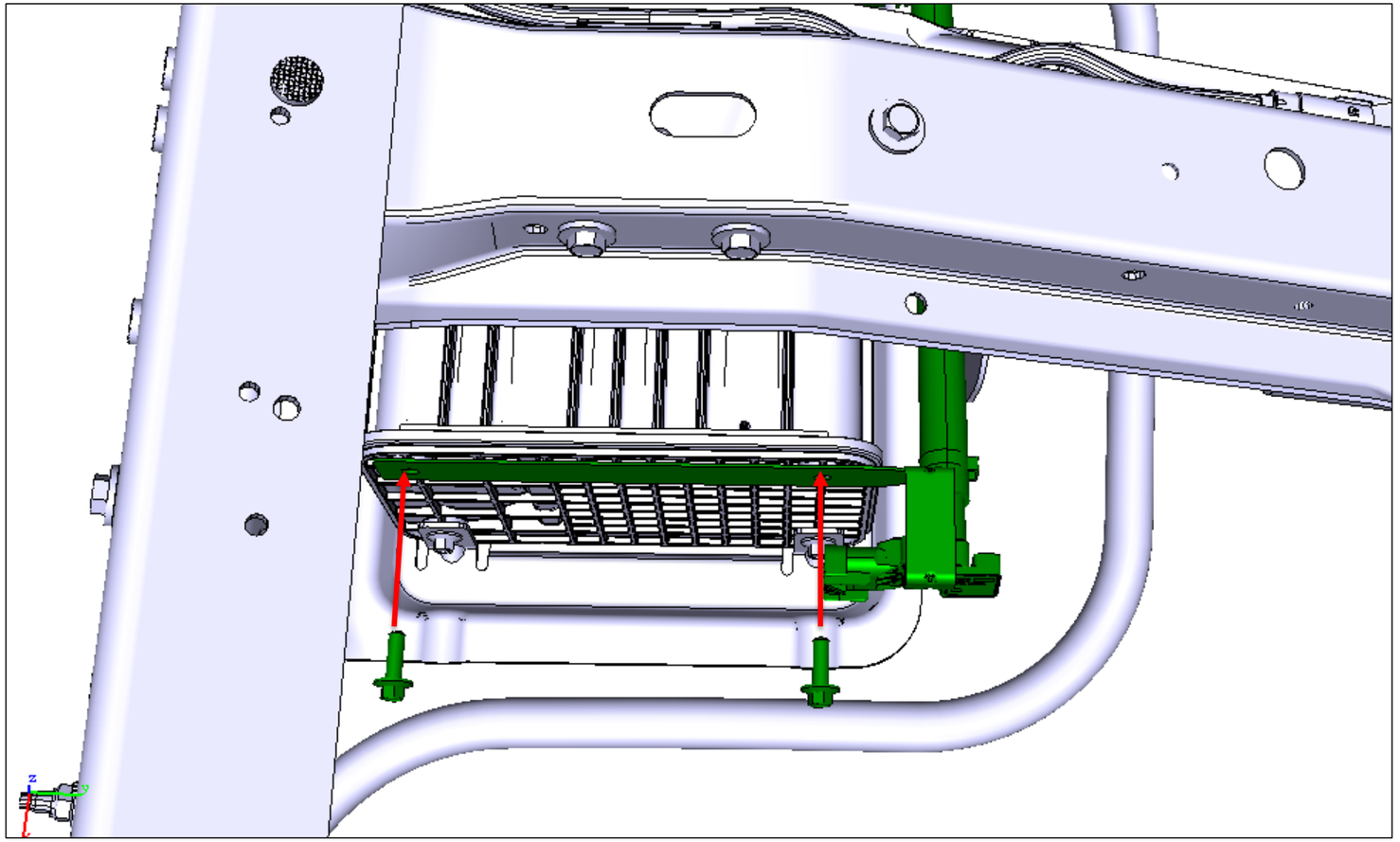


4. **Install the quick-connect side to the vapor canister. Make sure the connector clicks when sliding on to confirm correct installation/alignment.**



INSTALLING FTPT SENSOR, HOSE ASSEMBLY AND SENSOR BRACKET TO VAPOR CANISTER

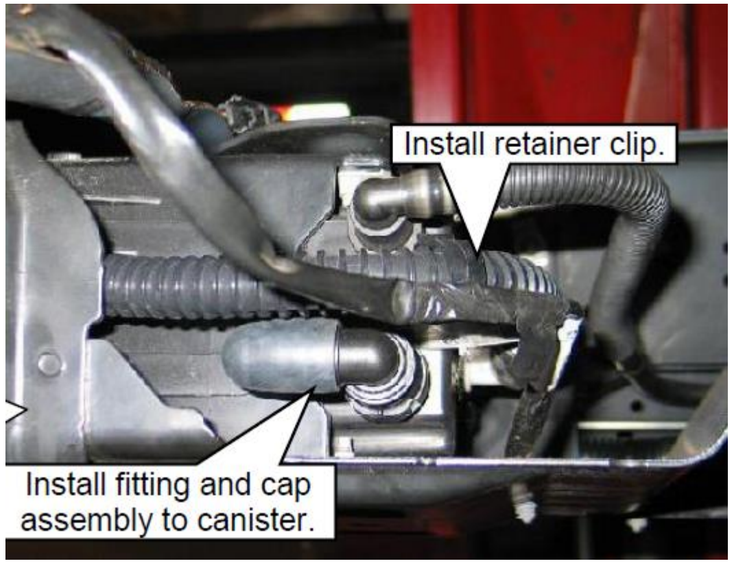
5. **Fasten the FTPT sensor assembly bracket to the rear of the vapor canister using two M6 hex flange self taping screw (11-031-0610), torque 2.5 – 3.0 Nm.**

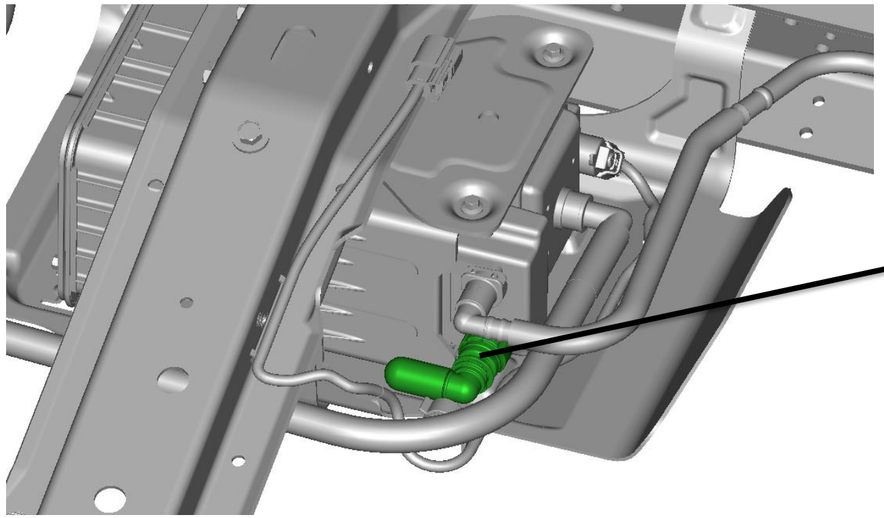


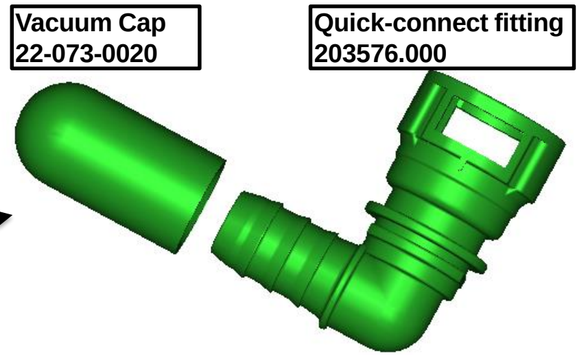
PLUGGING VAPOR CANISTER PORT AND SEALING FTPT CONNECTOR

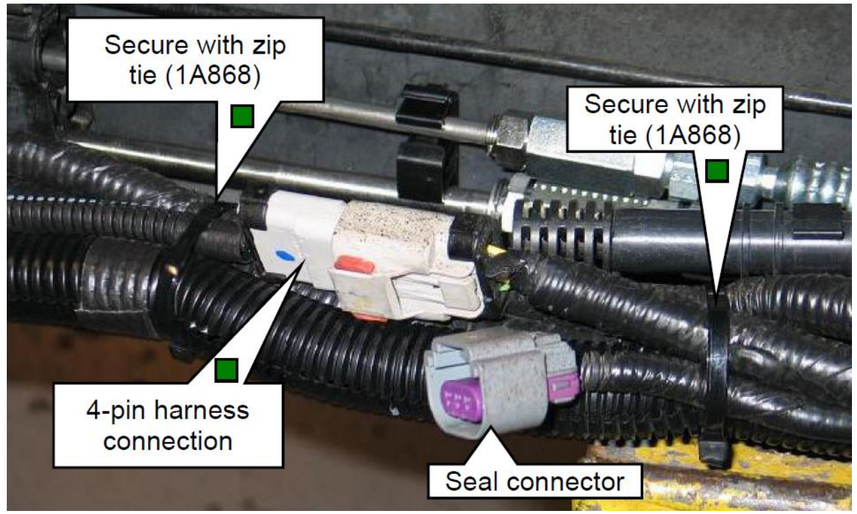
1. If removed, install evaporative canister and bracket assembly, attaching it to frame rail and crossmember, following Ford Workshop Manual, Section 303-13, Evaporative Emissions.
2. Preassemble quick-connect fitting and vacuum cap found in hardware kit P16JC-FRAME-A.
3. Install assembly on vapor canister port.
4. Install retainer clip to secure vehicle wiring harness as necessary.
5. Connect vehicle harness connector to evaporative canister vent solenoid. Use zip ties as needed.
6. The rear frame wiring harness includes a connector lead for a fuel temperature pressure transducer (FTPT). This lead is not used on E-450 Liquid Propane Autogas vehicles and requires connector end be sealed and secured:

- Pack connector terminals with Ford dielectric grease, or equivalent.
- Seal open end of connector with electrical tape.
- Use zip ties to secure rear wiring harness and FTPT connector to Ford vehicle harness.



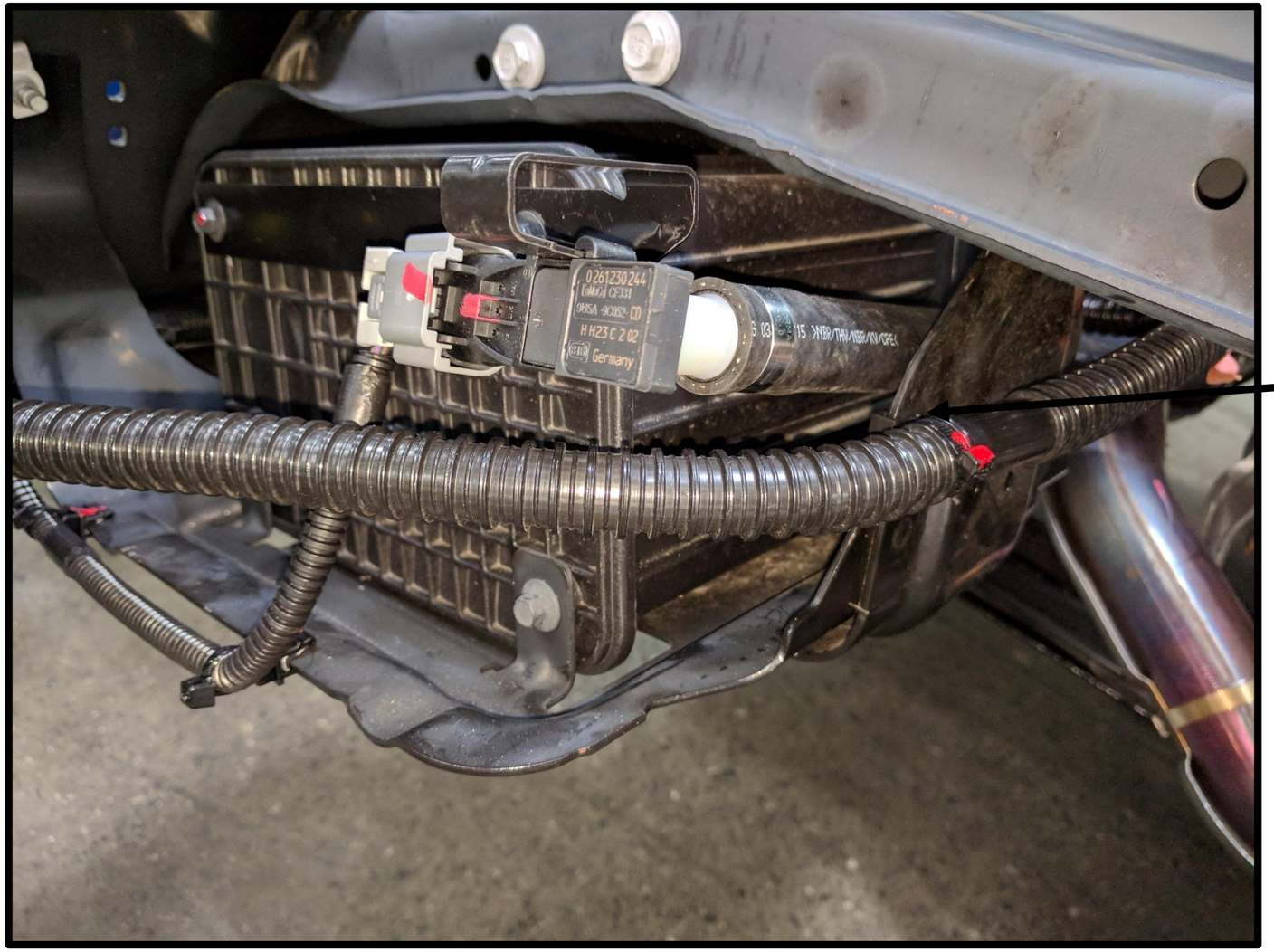


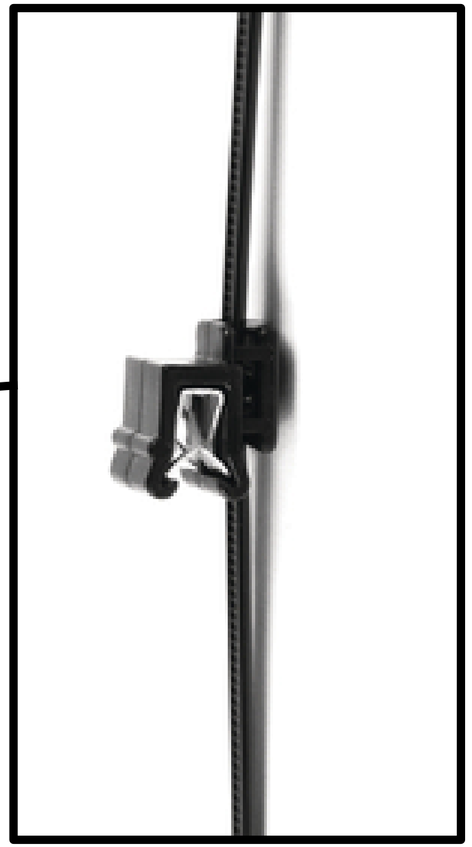




RETAIN FRESH AIR HOSE

1. **Retain fresh air hose to outside of canister bracket using edge clip (20-403-0005) as shown.**





Edge clip (20-403-0005)

ROUSH CLEANTECH WIRING HARNESS AND RETAINERS

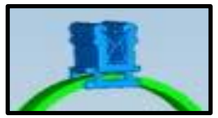
1. P16JC-18A100-AA Underhood harness-- Find the harness in the P16JC-ENGKIT-AA.
2. P16JC-18B100-AA CAN harness- - Find the harness in the P16JC-ENGKIT-AA
3. P16JC-18C200-AA Rear Frame harness- - Find the harness in the P16JC-FRAME-AA
4. P16JC-18K377-B Tank harness- Find the harness in the P16JC-FRAME-AA

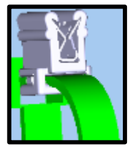
*** READ BEFORE STARTING THE INSTALLATION ***
There are only 3 types of retainers in the Electrical Kit to retain harnesses to the vehicle.

1. Use Tie Straps (20-403-0003) to retain the harnesses as shown in the following pages. In most cases, the CleanTech harnesses are tie strapped to the OEM harness. These tie straps are also used to secure the Tank harness to the propane fuel tank.

.  Find the ZIP TIE, 11 3/4" LONG-STANDARD in the P16JC-ENGKIT-AA.

2. Use Plastic Edge Clips (20-403-0011 and 156-00552) to retain a portion of the Underhood harness. See following pictures.


156-00552

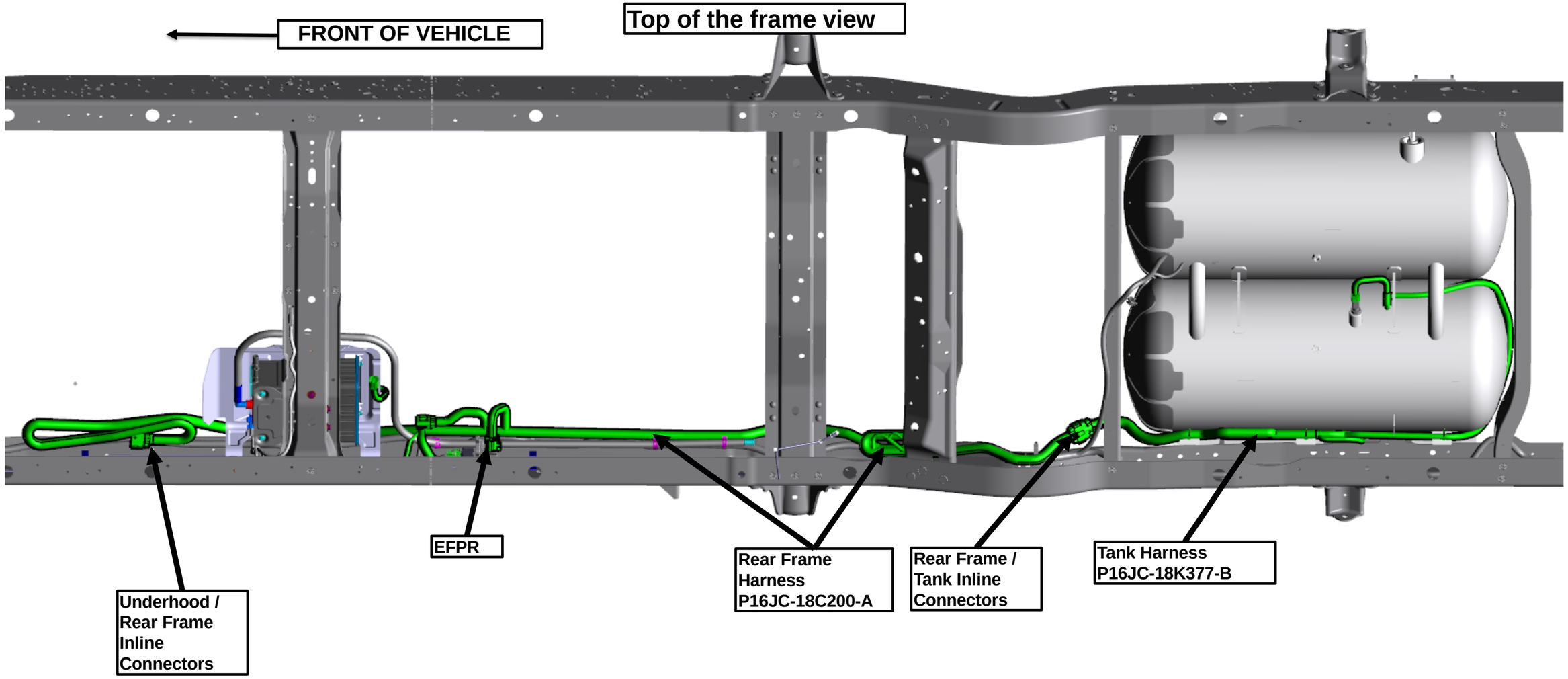

20-403-0011

1. Find the 156-00552, PLASTIC EDGE CLIP, 1-3 mm thick in the P16JC-ENGKIT-AA.
2. Find the 20-403-0011, PLASTIC EDGE CLIP, 1-3 mm thick in the P16JC-ENGKIT-AA.

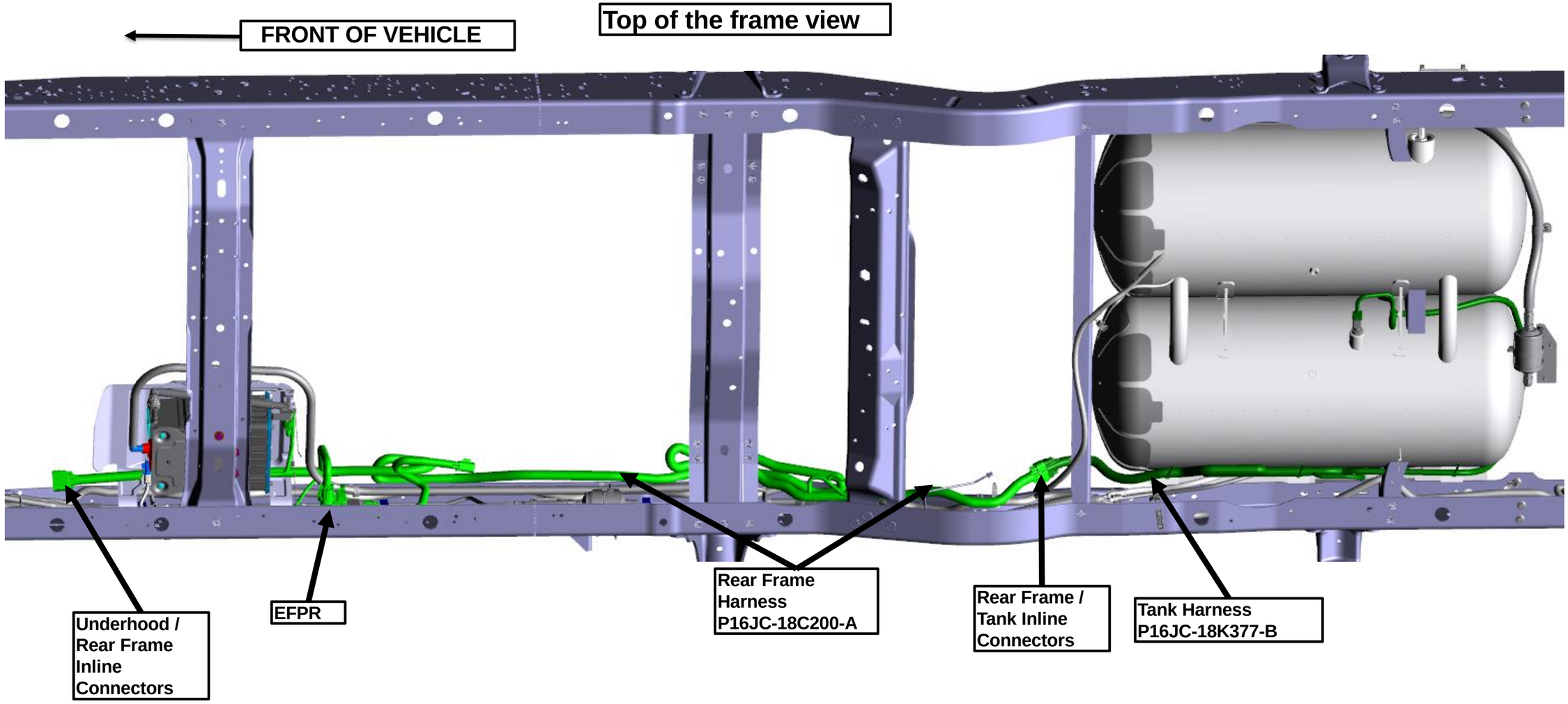
3. Use Metal Edge Clips (11-056-0044) to retain a portion of the Rear Frame harness. Note that a tie strap does not come attached to metal edge clip like the plastic edge clip. You'll need to insert a tie strap (20-403-0003) into metal edge clip in the orientation shown in following pictures. Insert clip picture.

 Find the in Metal Edge Clips (11-056-0044) the P16JC-FRAME-AA

WIRING OVERVIEW FOR REAR HALF OF VEHICLE (standard tank shown) – E-450 158/176WB ONLY (INCLUDING EXTENDED WB)

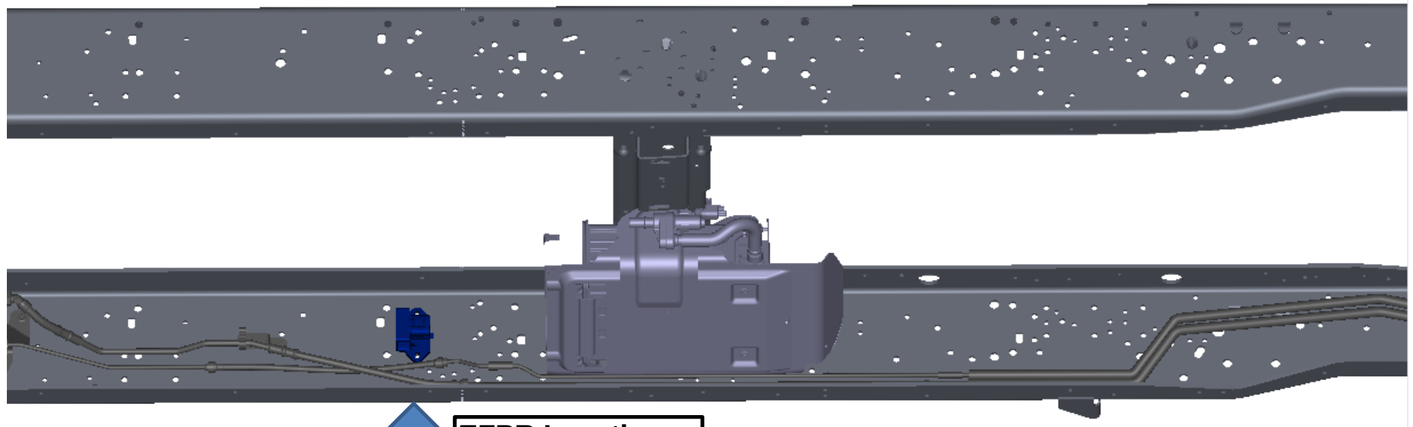


WIRING OVERVIEW FOR REAR HALF OF VEHICLE (standard tank shown) – E-350 138WB ONLY

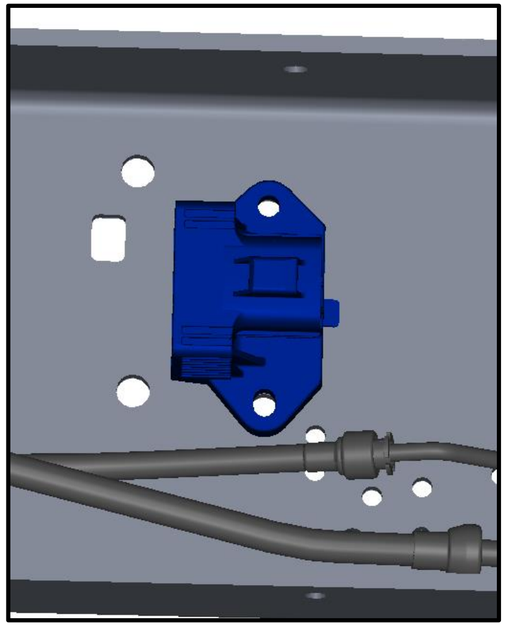


INSTALLING THE NEW ELECTRONIC FUEL PUMP RELAY (EFPR) – E-450 158/176WB ONLY (INCLUDING EXTENDED WB)

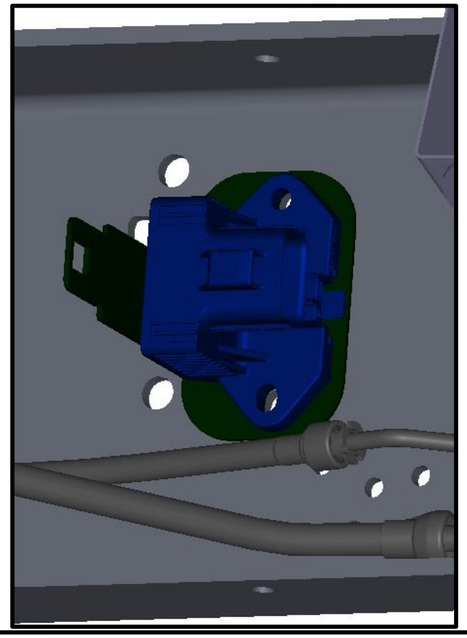
1. **Remove the OEM EFPR and keep the mounting hardware**
2. **Place EFPR bracket (P14MB-03P301-A) underneath OEM EFPR as shown in the image below and attach using the same hardware. Torque to 7.6-10.4 Nm.**
3. **Install RCT EFPR (FU5A-9D370-J) on bracket above OEM EFPR by sliding it into place as shown.**



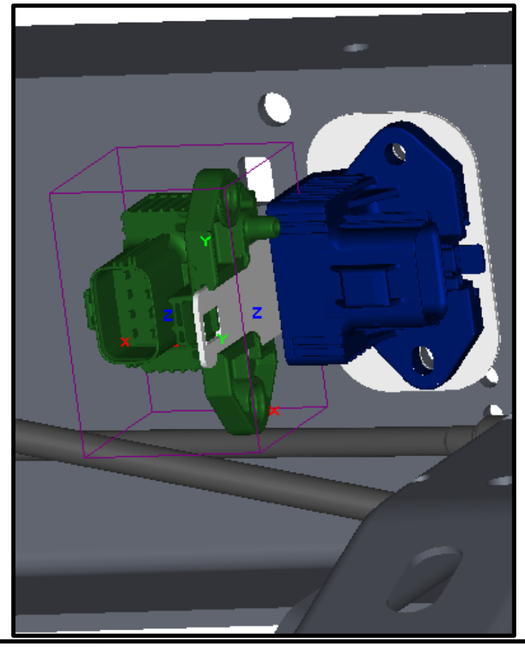
Step 1



Step 2



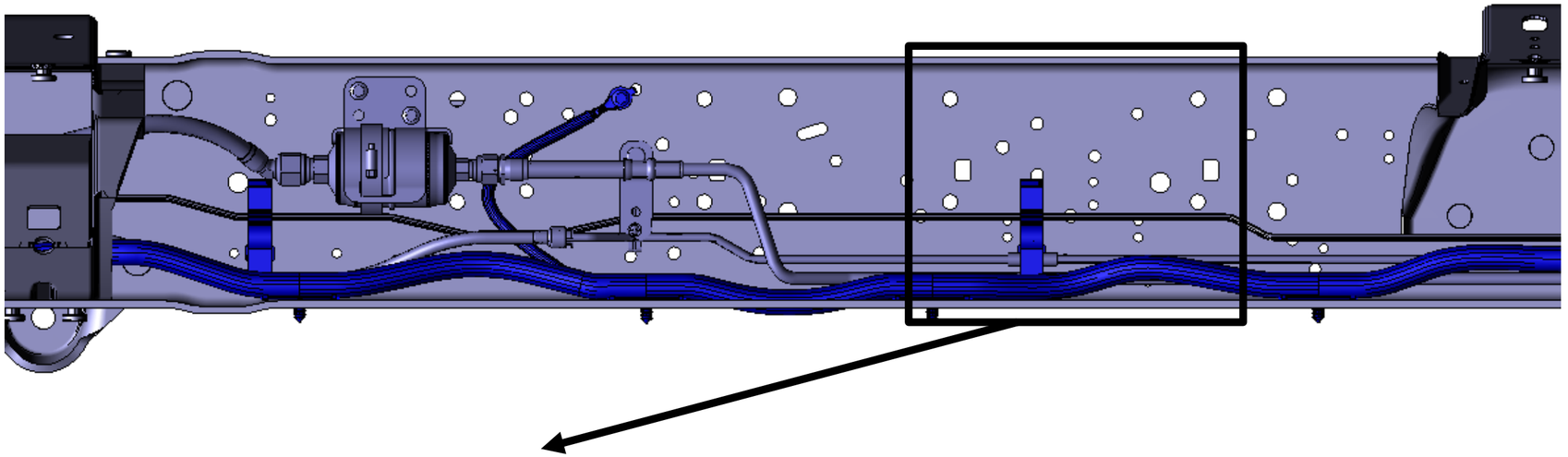
Step 3

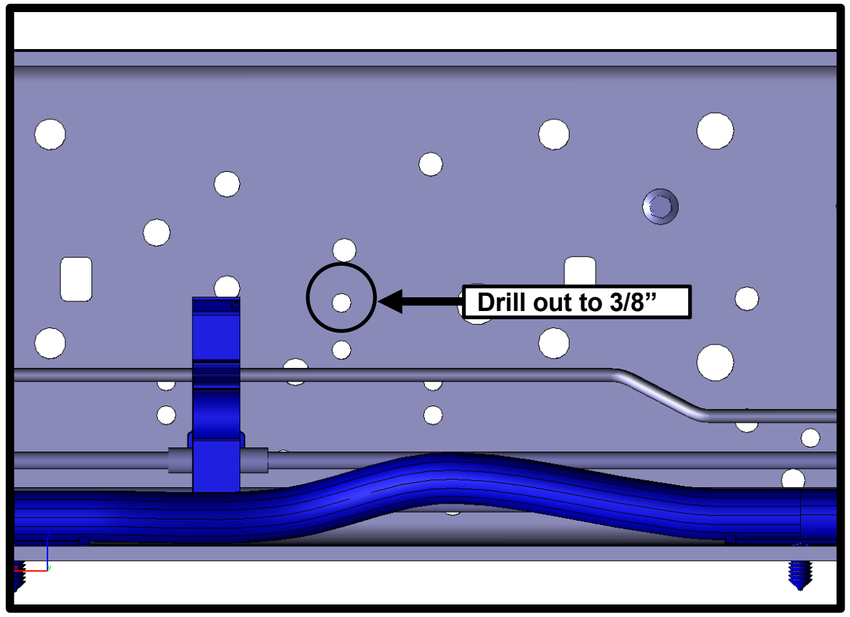


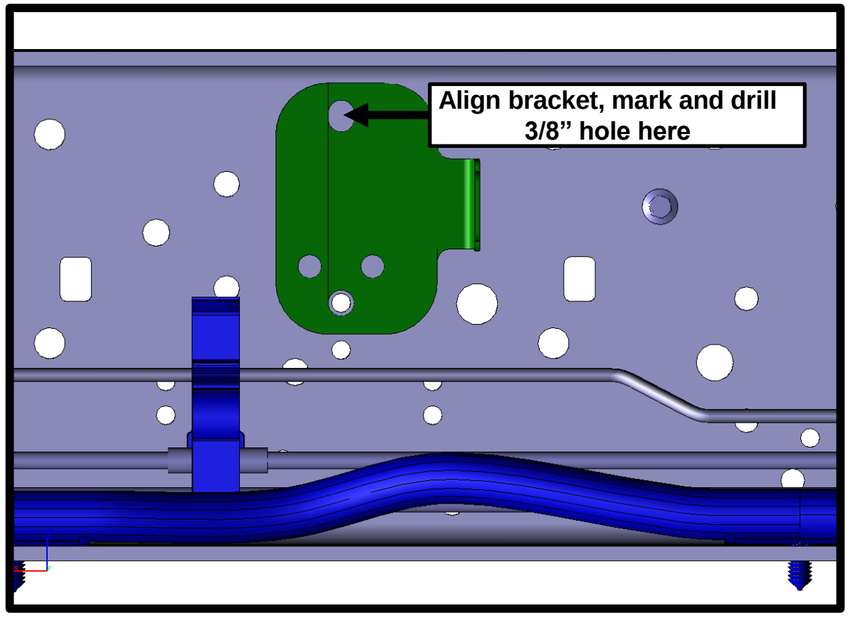
DISCARD REUSE NEW

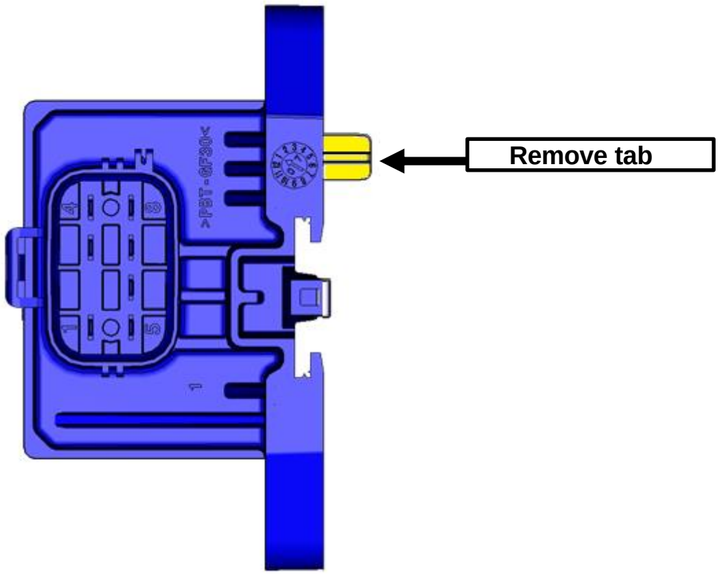
INSTALLING THE NEW ELECTRONIC FUEL PUMP RELAY (EFPR) – E-350 138WB ONLY

1. **Locate hole on frame as shown and drill out to 3/8”**
2. **Align bracket (P14MB-03P301-A) to frame using previously drilled out hole. Mark and drill 2nd hole using 3/8” drill bit.**
3. **Remove plastic tab on OEM EFPR**



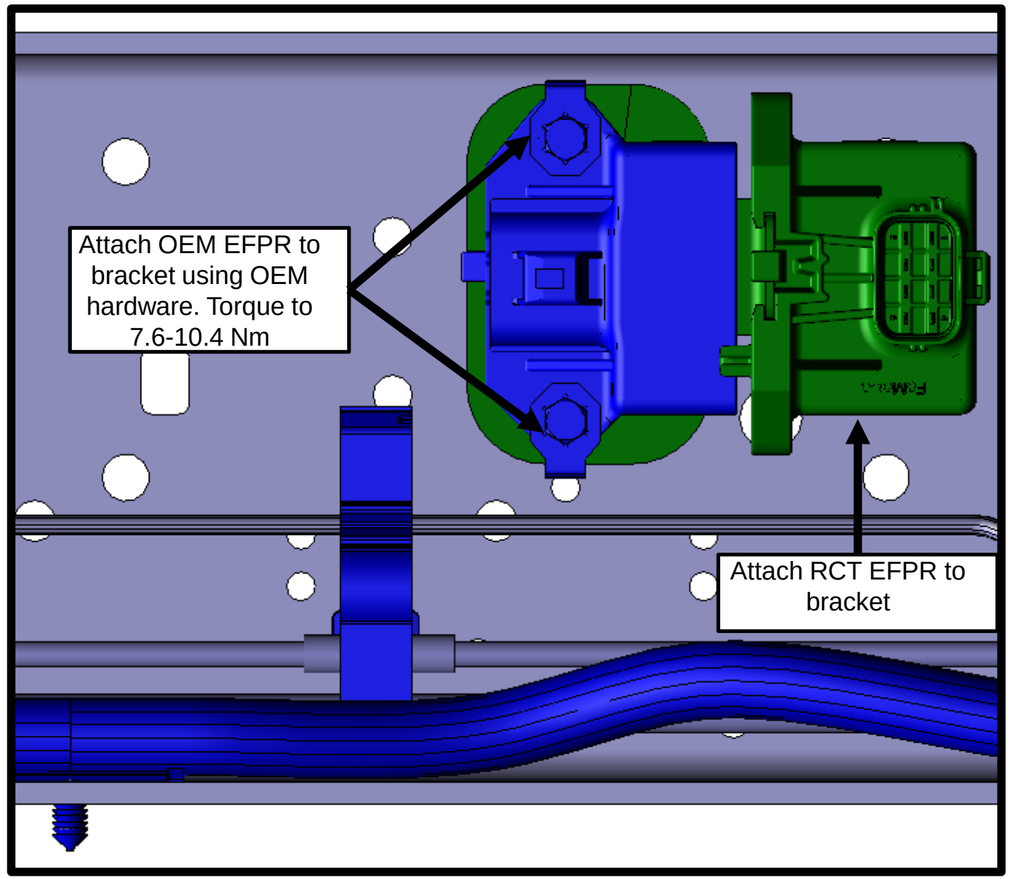




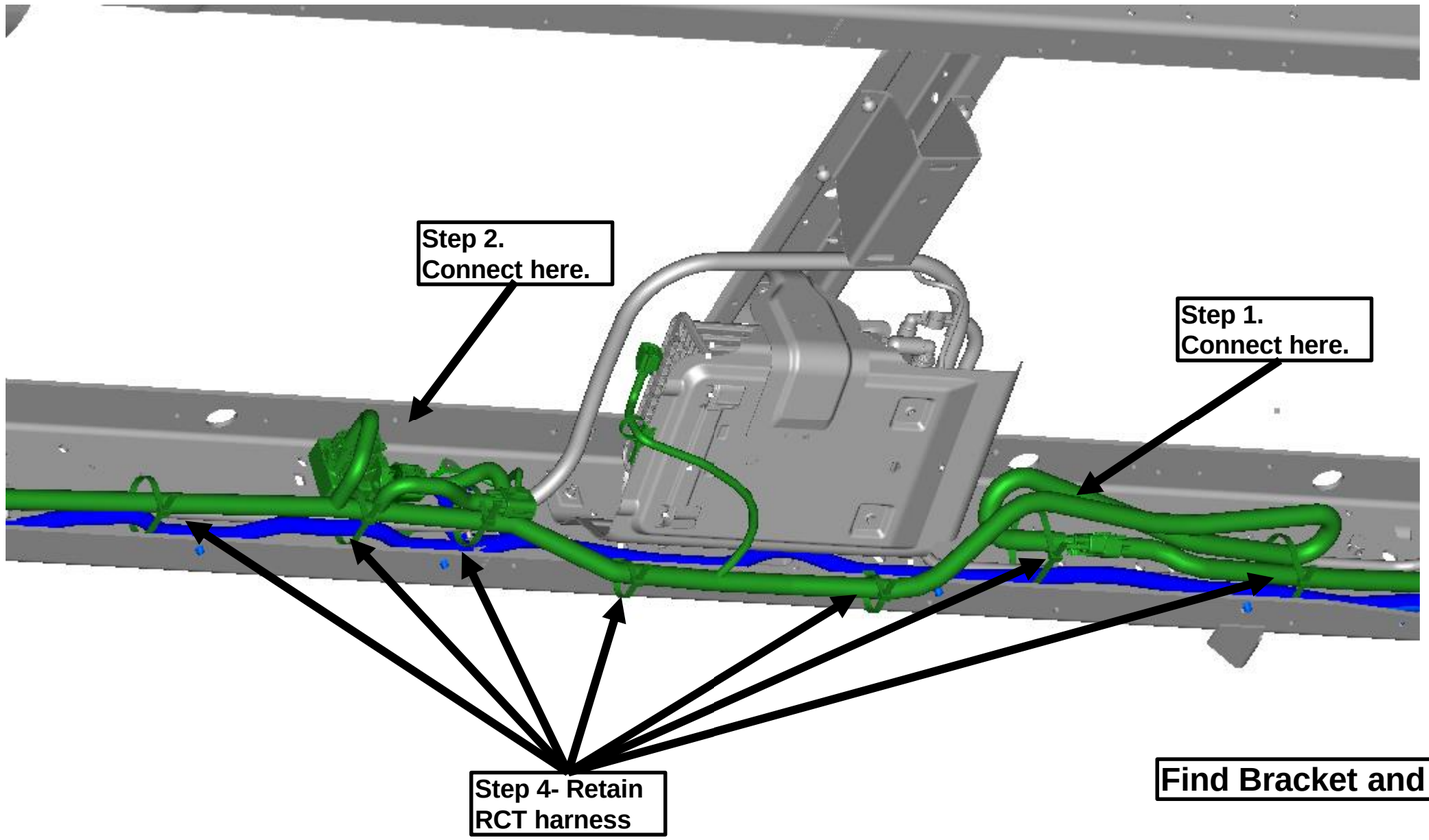


INSTALLING THE NEW ELECTRONIC FUEL PUMP RELAY (EFPR) – E-350 138WB ONLY

1. **Place EFPR bracket (P14MB-03P301-A) underneath OEM EFPR as shown in the image below and attach using the same hardware. Torque to 7.6-10.4 Nm.**
2. **Install Roush EFPR (FU5A-9D370-J) on bracket next to OEM EFPR by sliding it into place as shown.**



INSTALL EFPR AND REAR FRAME HARNESS – E-450 158/176WB ONLY (INCLUDING EXTENDED WB)



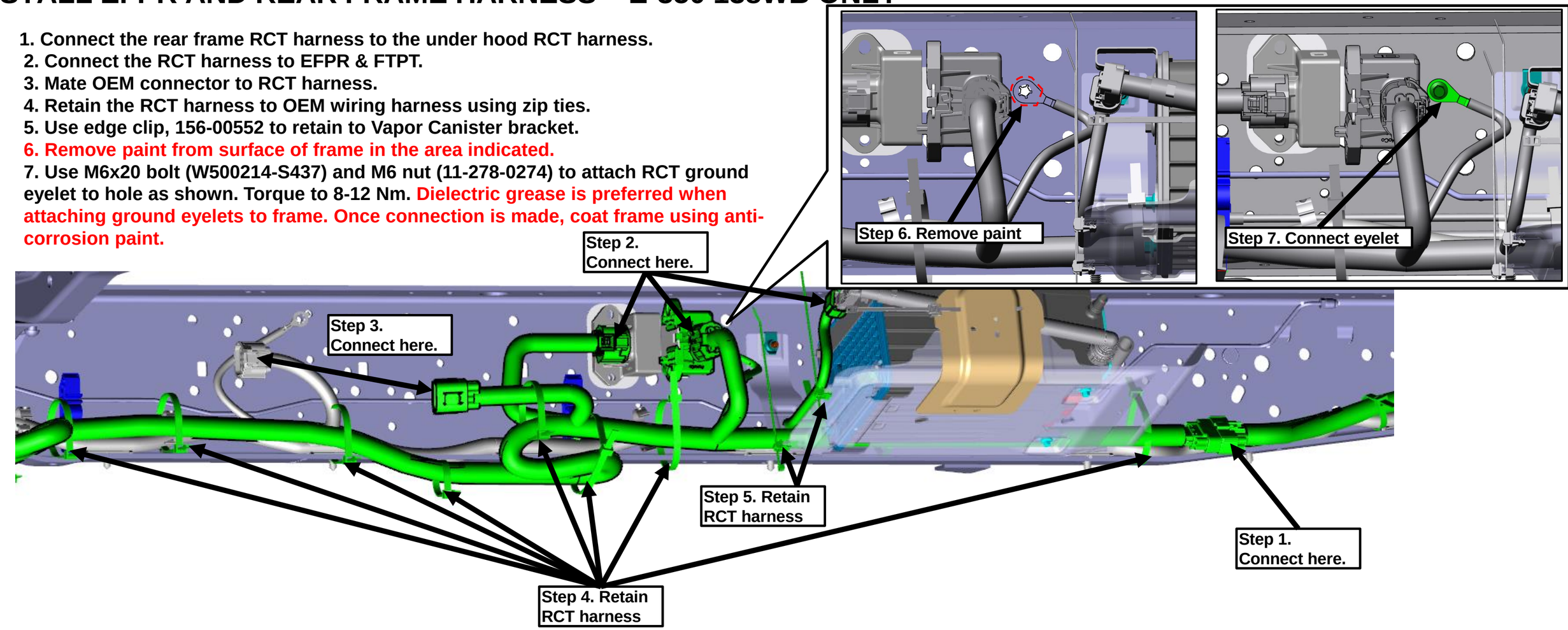
1. Connect the rear frame RCT harness to the under hood RCT harness.
Connect the RCT harness to EFPR.
Retain the RCT harness to FORD wiring harness using zip ties.

NOTE: Harness hanking dependent on WB (158WB shown)

Find Bracket and EFPR hardware in P16JC-FRAME-AA

INSTALL EFPR AND REAR FRAME HARNESS – E-350 138WB ONLY

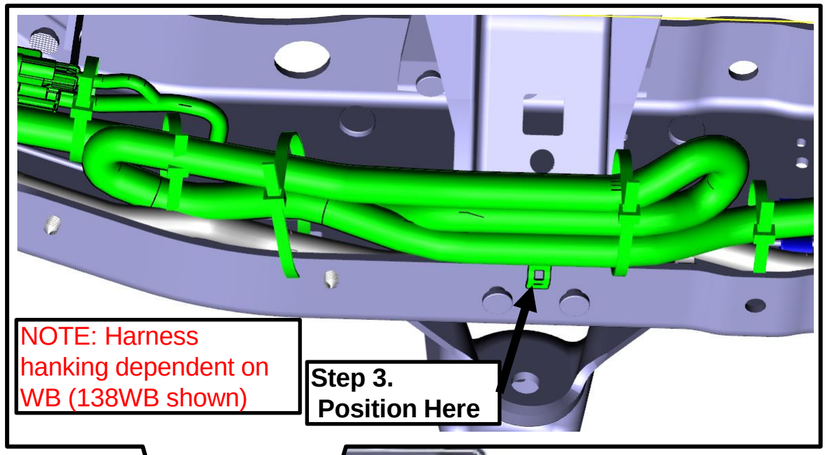
1. Connect the rear frame RCT harness to the under hood RCT harness.
2. Connect the RCT harness to EFPR & FTPT.
3. Mate OEM connector to RCT harness.
4. Retain the RCT harness to OEM wiring harness using zip ties.
5. Use edge clip, 156-00552 to retain to Vapor Canister bracket.
6. Remove paint from surface of frame in the area indicated.
7. Use M6x20 bolt (W500214-S437) and M6 nut (11-278-0274) to attach RCT ground eyelet to hole as shown. Torque to 8-12 Nm. Dielectric grease is preferred when attaching ground eyelets to frame. Once connection is made, coat frame using anti-corrosion paint.

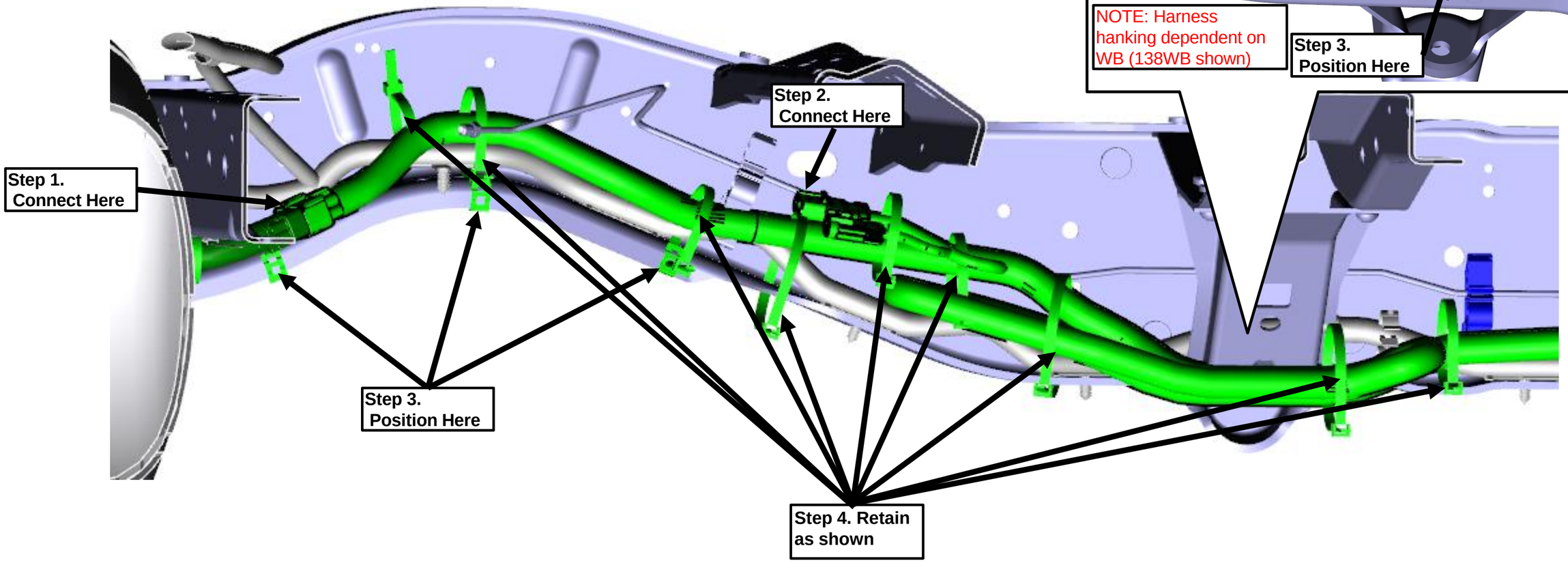


Find Bracket and EFPR hardware in P16JC-FRAME-AA

CONNECT THE REAR FRAME HARNESS TO TANK HARNESS

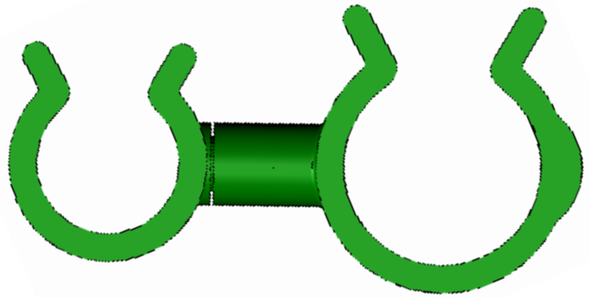
1. Connect the rear frame RCT harness to the tank RCT harness.
2. Connect the circuits from the OEM Gasoline pump to the RCT harness.
3. Install metal frame clips, 11-056-0044, onto frame in the positions shown.
4. Retain the RCT harness to OEM wiring harness and metal frame clips using zip ties.

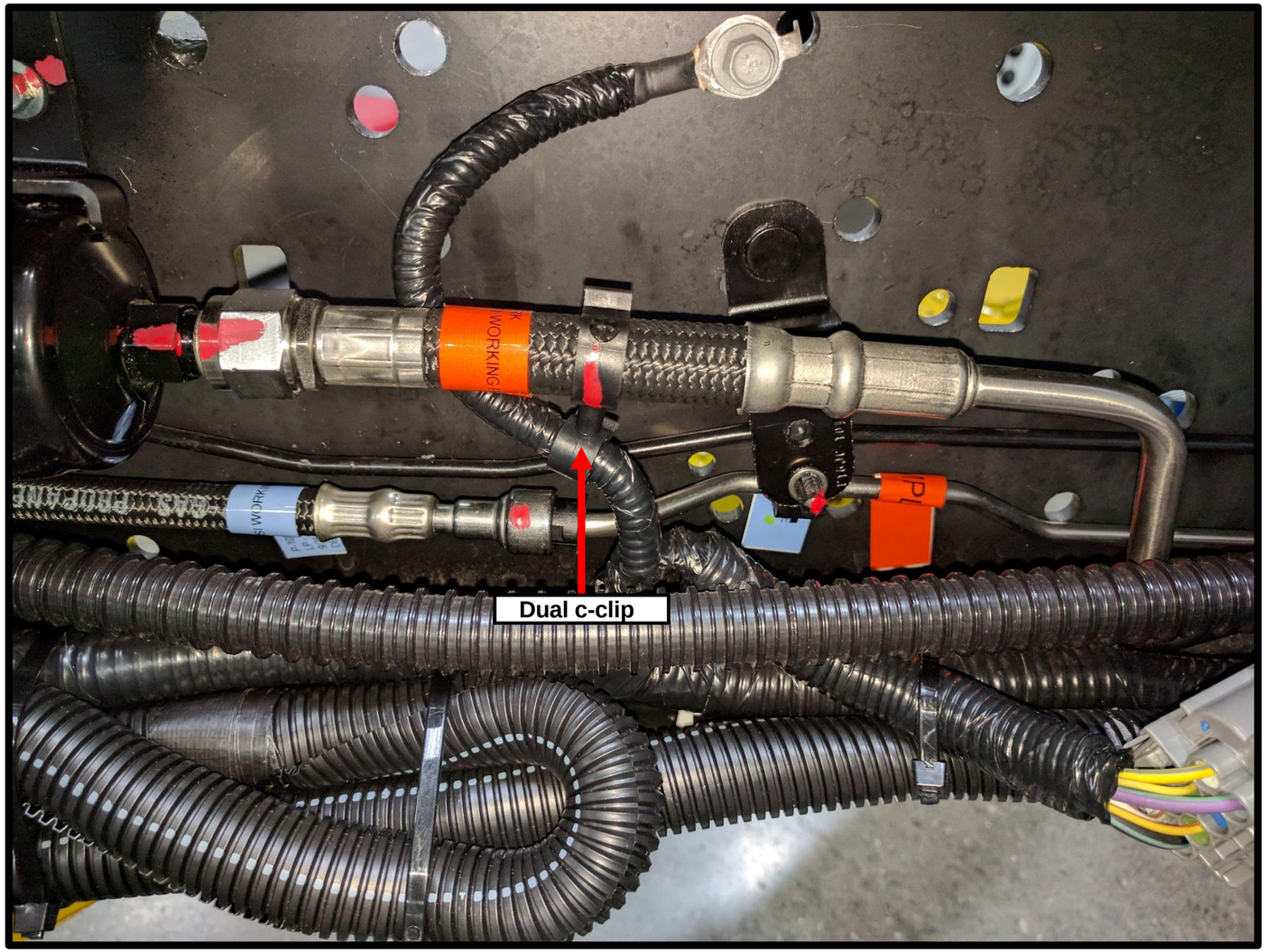




RETAIN HARNESS AWAY FROM FORWARD LINE – E-350 138WB ONLY

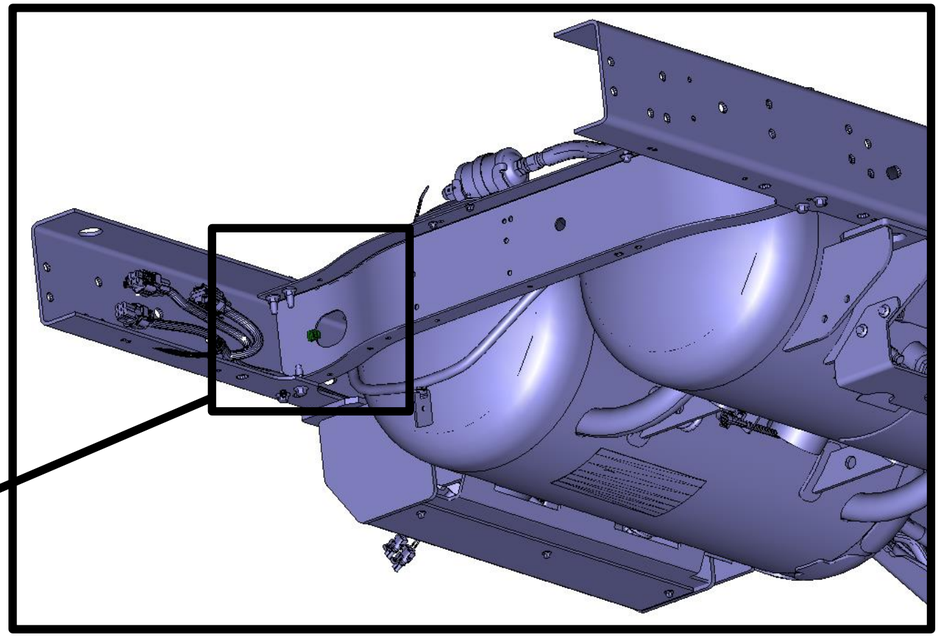
1. **Use dual c-clip (W713776-S300) to retain harness ground wire away from forward supply line as shown**

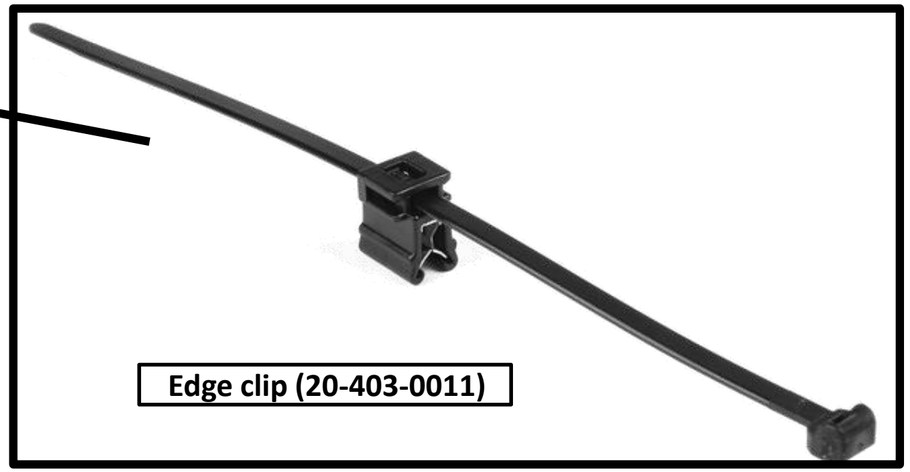




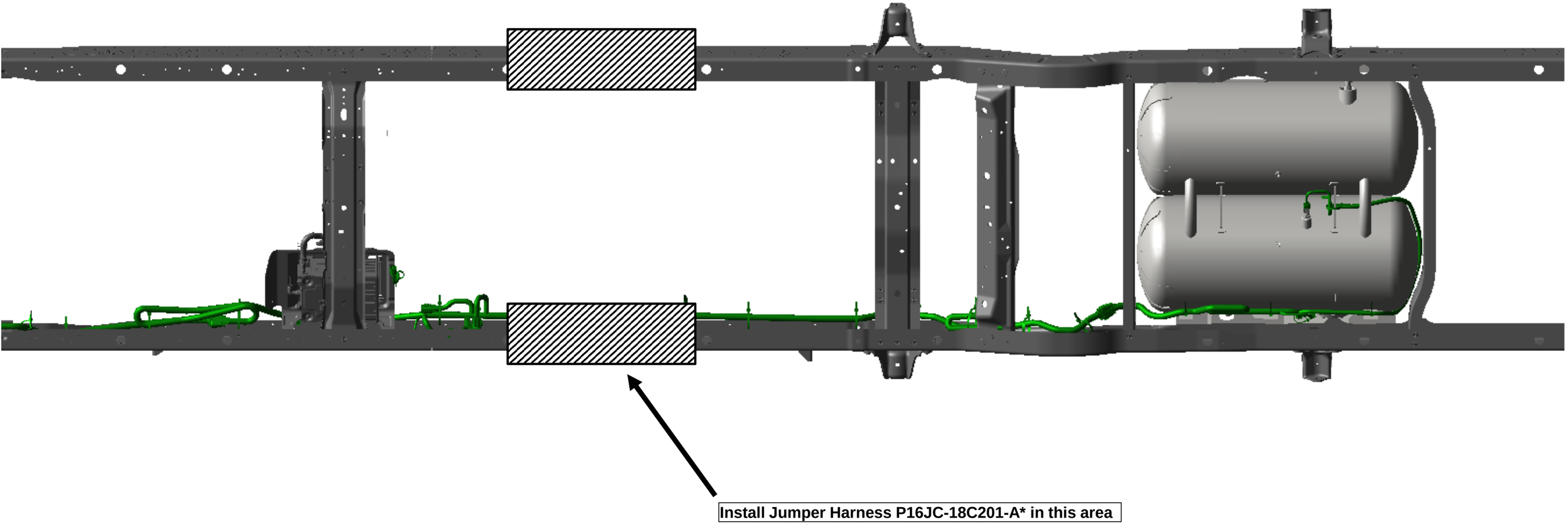
RETAIN TRAILER HARNESS INSIDE CROSSMEMBER – E-350/E-450 STANDARD RANGE TANK ONLY

1. **Use edge clip (20-403-0011) to retain trailer harness at rear crossmember hole as shown.**





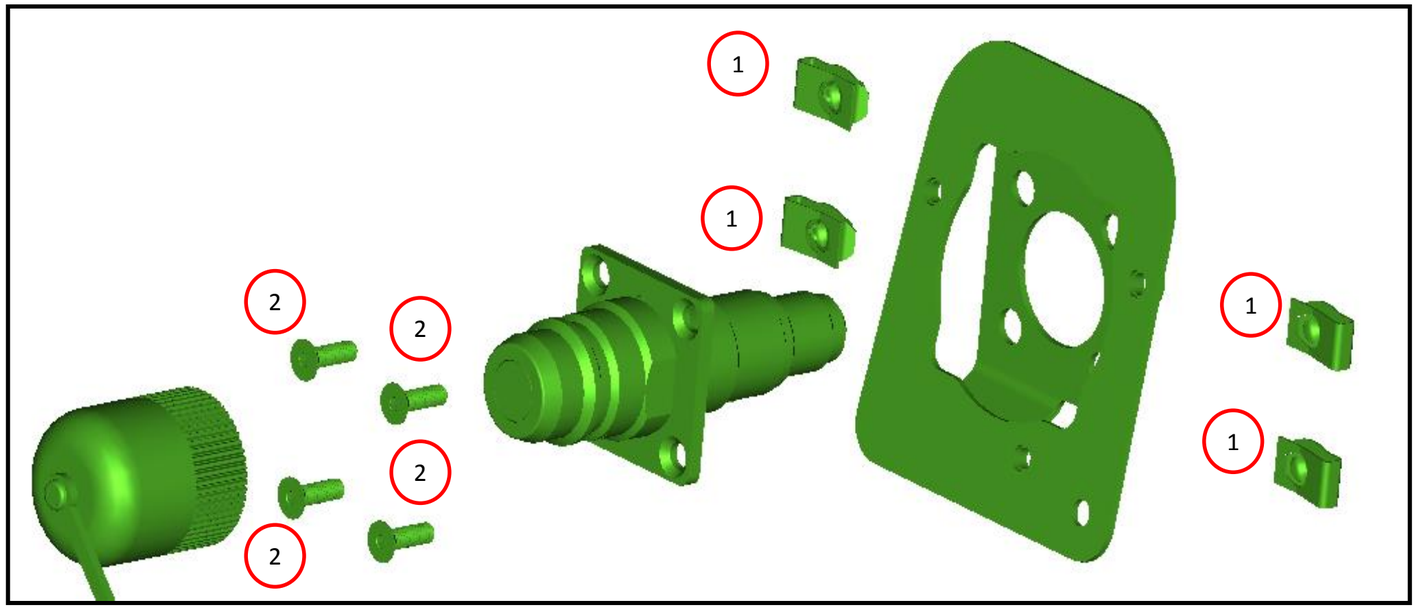
WIRE HARNESS JUMPER FOR EXTENDED WHEELBASES ONLY

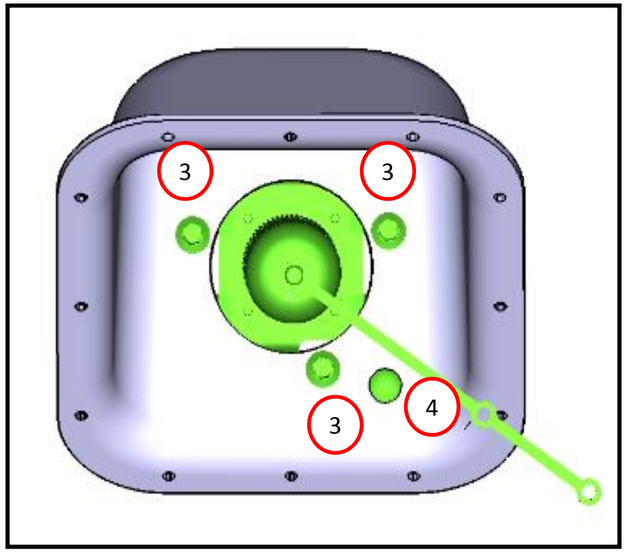


ASSEMBLING THE FILL VALVE (EURO VALVE)

NOTE: THESE STEPS ARE FOR THE EURO FILL VALVE (QUICK CONNECT STYLE) ONLY. IF YOUR VEHICLE HAS THE ACME VALVE (THREADED STYLE) THEN PLEASE SKIP TO THE NEXT PAGE.

1. Attach Qty. 4 J-clips (95210A130) to the Euro Valve bracket (**P16MB-10D310-A).**
2. Attach the Euro Valve (22-4945) to the bracket using Qty. 4 bolts 11-357-0321. Torque the bolts to 5-7 Nm.
3. Install fuel fill valve assembly to the body mounting bracket using Qty. 3 bolts 11-031-0583. Torque the bolts to 5–7 Nm.
4. Thread on the Valve Dust Cover (14-6053-900) and retain the tether to the bracket using a nylon rivet (11-341-0561).

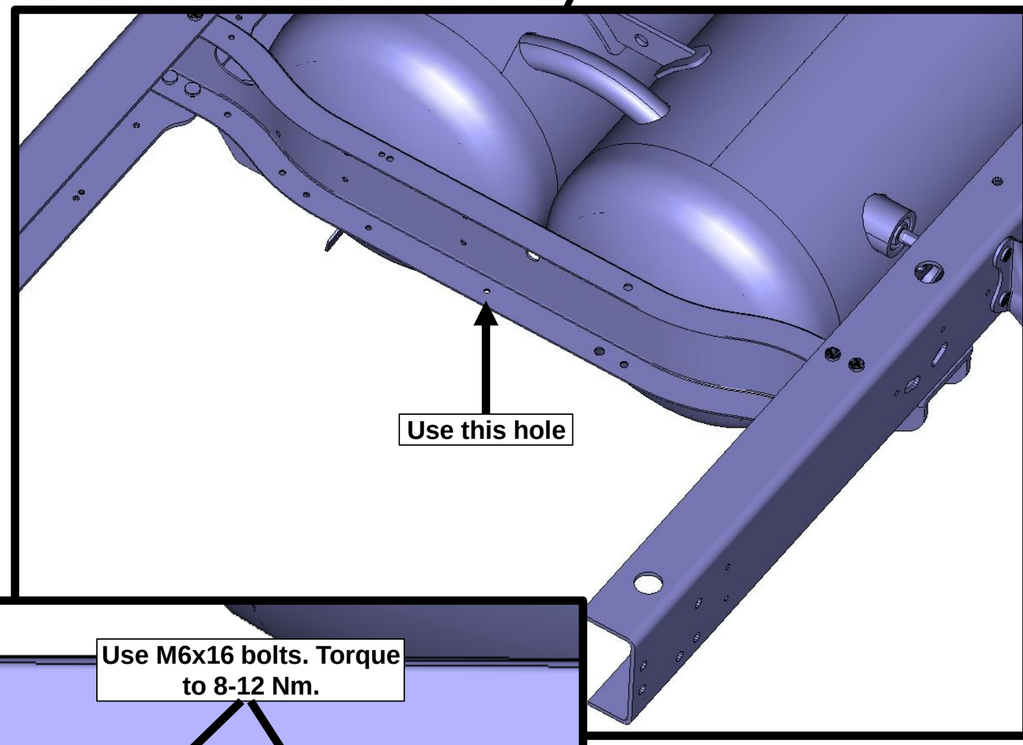


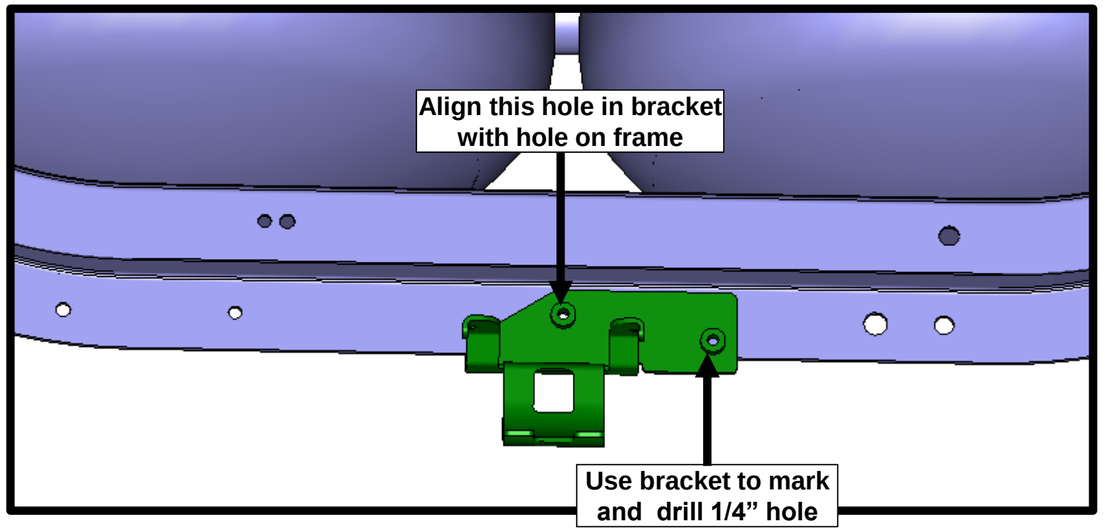


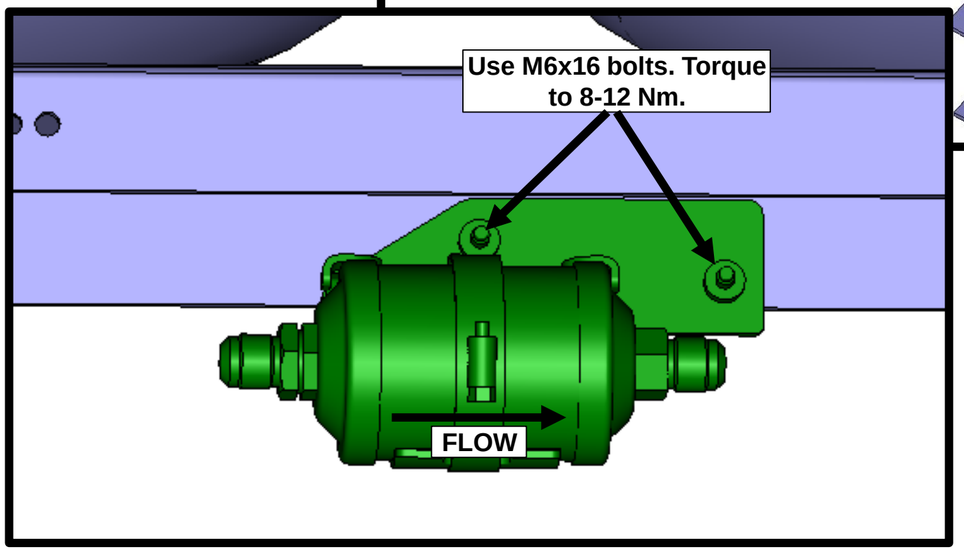
Note- Find hardware in P16JC-FRAME-AA and P16JC-FILLTYPE-AA

INSTALL FUEL FILL LINE AND FILTER – E-450 158/176WB (AND EXTENDED FRAME)

1. Locate hole on rear crossmember and position filter bracket (P11GD-10D220-A) using hole as shown. Mark and drill 2nd 1/4” hole. Cover hole with anti-corrosion paint.
2. Attach bracket to crossmember using qty (2) M6x16 bolts. Torque to 8-12 Nm
3. Install filter into bracket using clamp. ENSURE FILTER FLOW ARROW IS POINTING TOWARDS PASSENGER SIDE OF VEHICLE. Tighten clamp, torque to 8-12 Nm

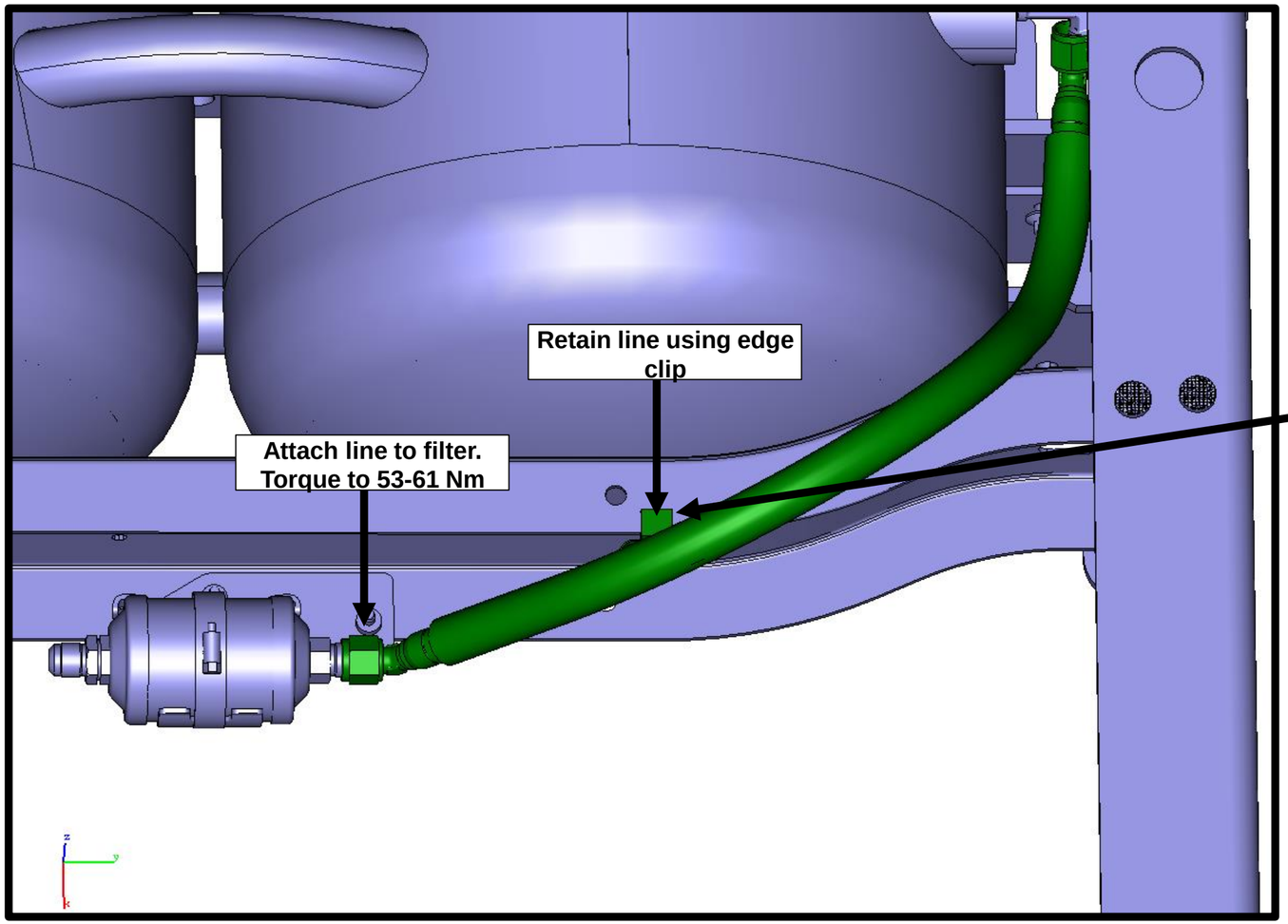


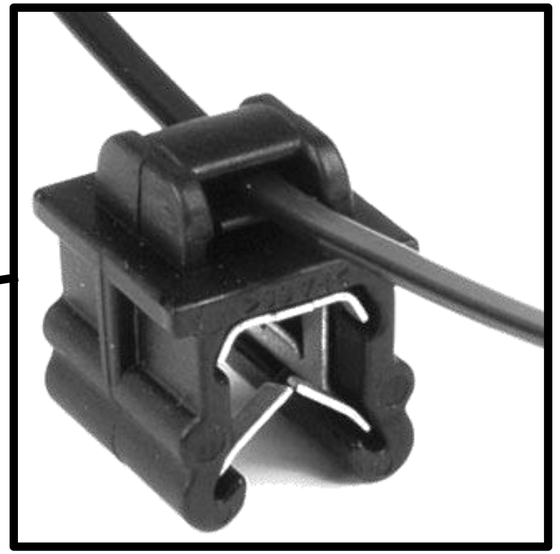




INSTALL FUEL FILL LINE AND FILTER – E-450 158/176WB (AND EXTENDED FRAME)

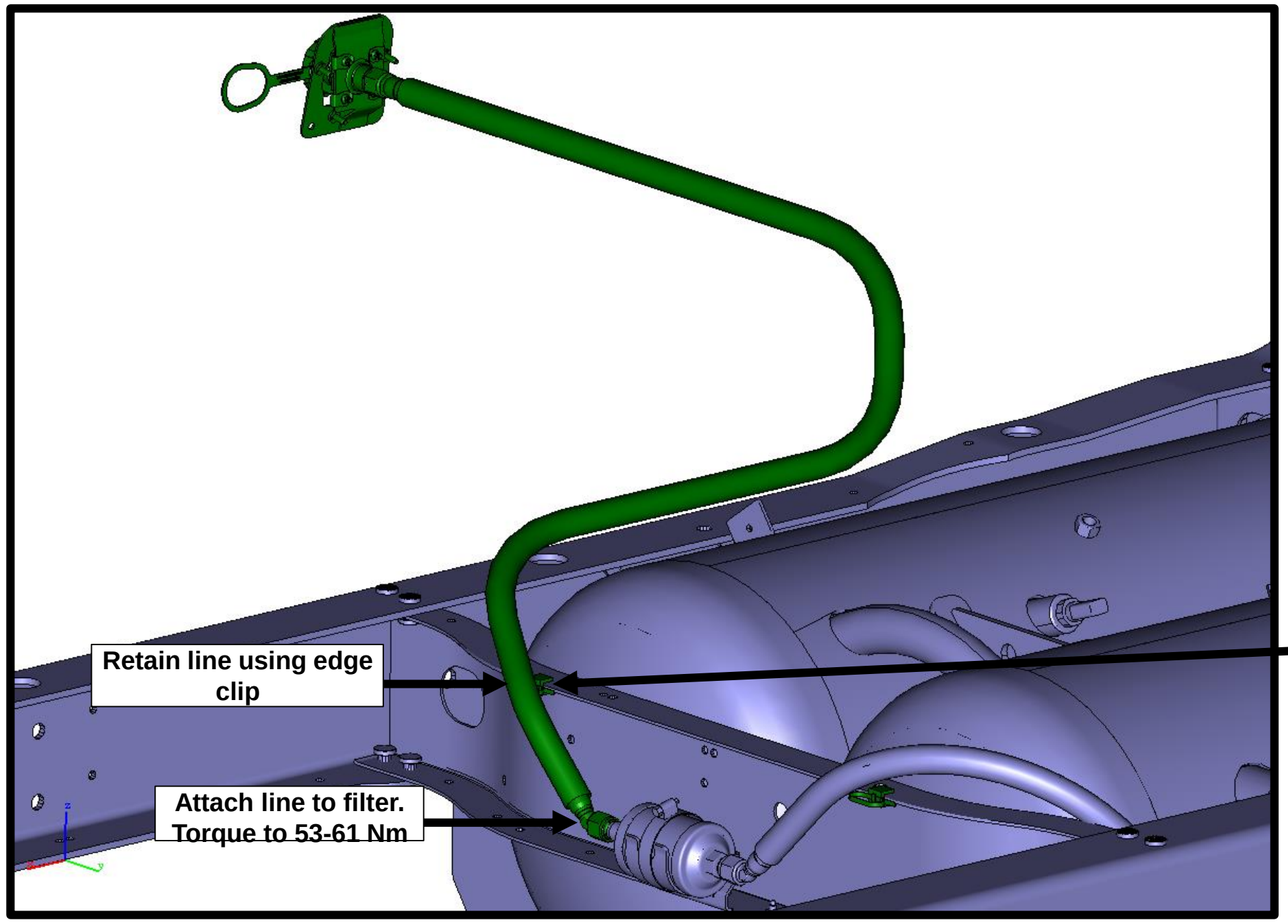
1. **Wrap short fill line (P-10D12X-D-XXX) with matching length 1” diameter convolute.**
2. **Attach fill line to filter. Torque to 53-61 Nm.**
3. **Retain fill line to crossmember using edge clip (156-00537).**

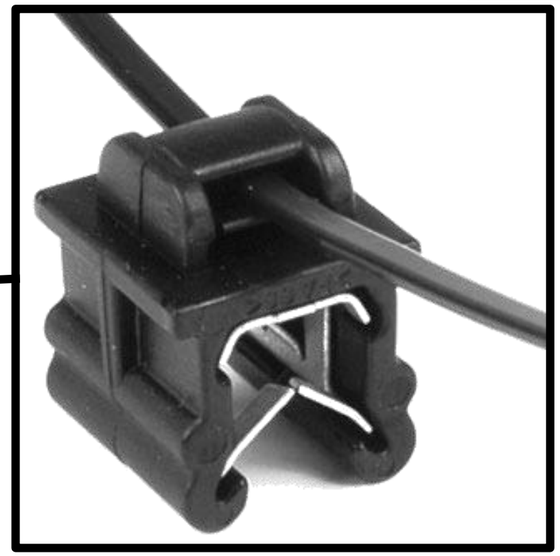


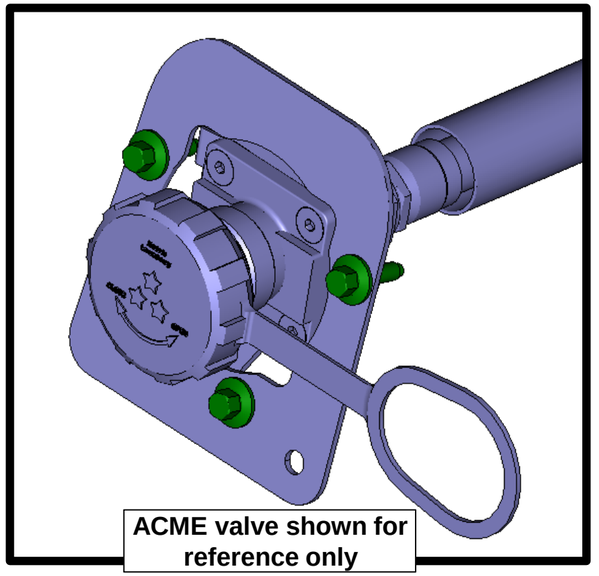


INSTALL FUEL FILL LINE AND FILTER – E-450 158/176WB (AND EXTENDED FRAME)

1. Wrap long fill line (P-10D12X-D-XXX) with matching length 1” diameter convolute.
2. Attach fill line to filter. Torque to 53-61 Nm.
3. Retain fill line to crossmember using edge clip (156-00537).
4. Route fill line to outside of body, using extreme caution not to route hose on sharp edges. Use additional edge clips if needed to retain fill line.
5. Attach fill valve to body using qty (3) M5x16 bolts. Torque to 5-7 Nm.

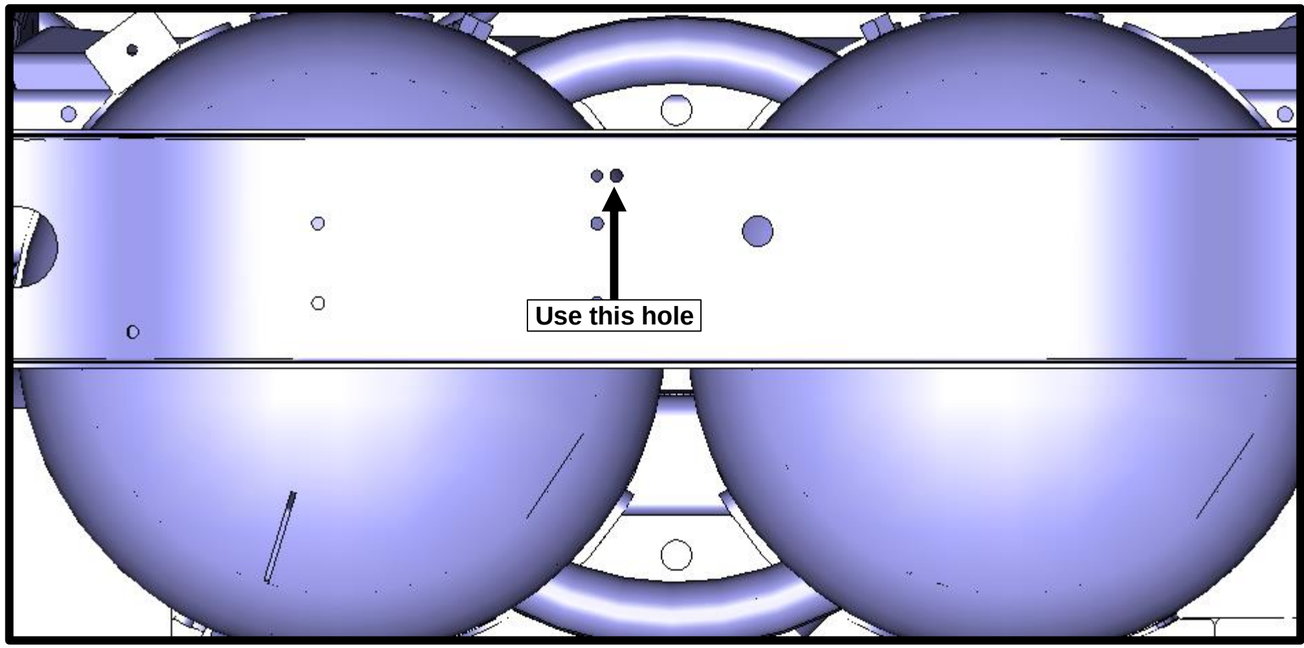


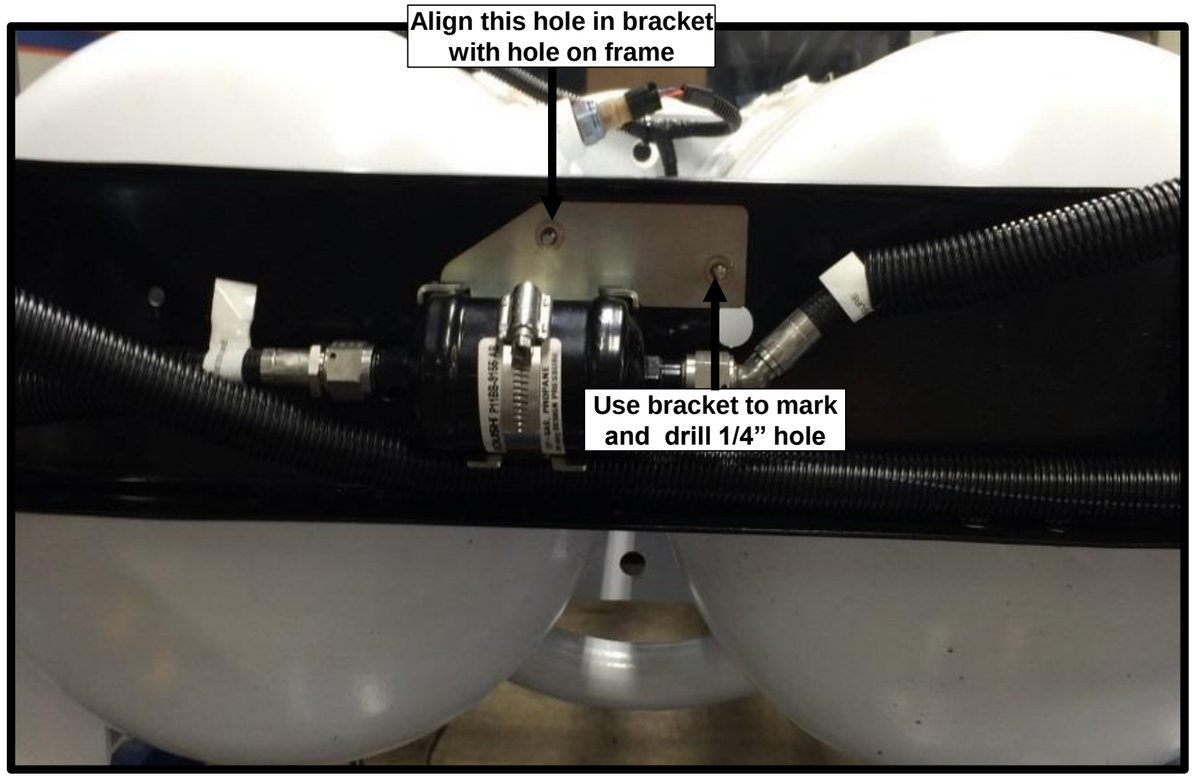




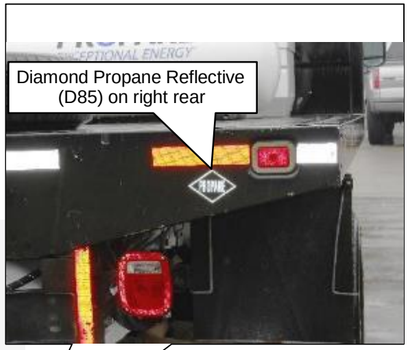
ALTERNATE LOCATION FOR FILL FILTER INSTALL E-450 158/176WB (AND EXTENDED FRAME)

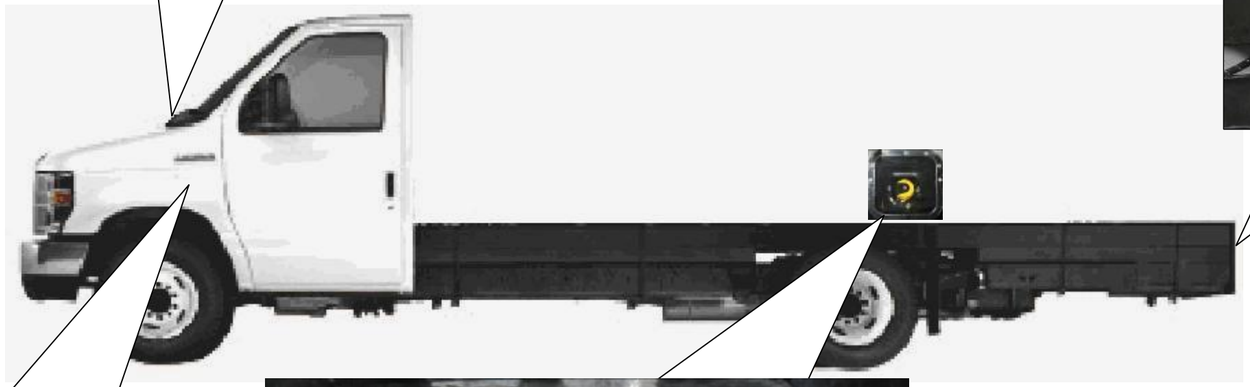
1. Locate hole on rear crossmember and position filter bracket (P11GD-10D220-A) using hole as shown. Mark and drill 2nd ¼" hole. Cover hole with anti-corrosion paint.
2. Attach bracket to crossmember using qty (2) M6x16 bolts. Torque to 8-12 Nm
3. Install filter into bracket using clamp. ENSURE FILTER FLOW ARROW IS POINTING TOWARDS PASSENGER SIDE OF VEHICLE. Tighten clamp.
4. Follow remaining steps from fill system install on previous pages.



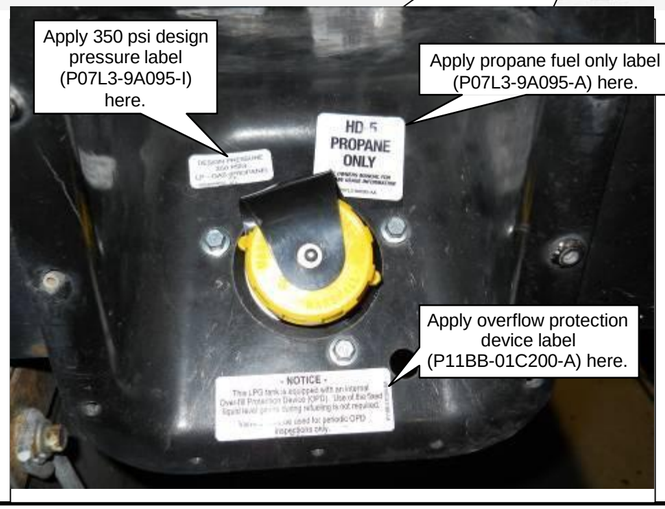


INSTALLING BADGES AND LABELS AND COMPLETING THE KIT INSTALLATION





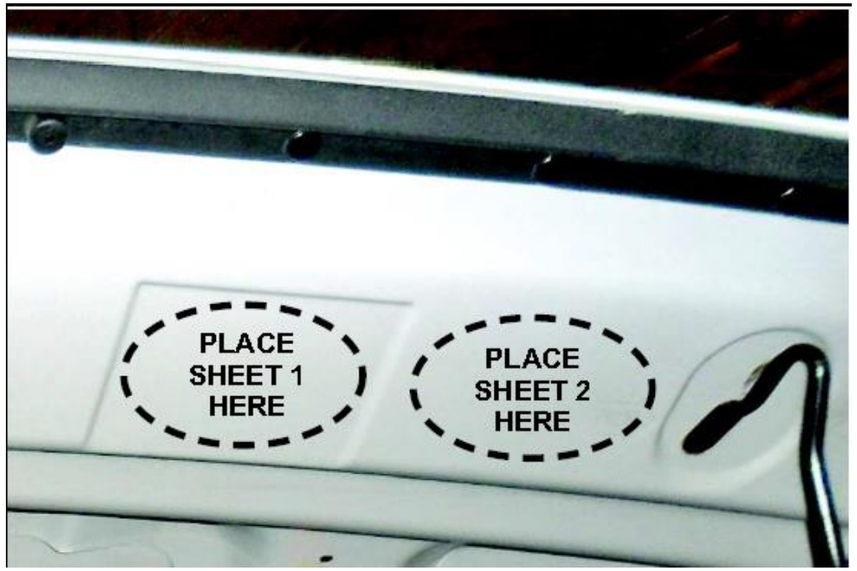
ROUSH CleanTech Logo Dome Label (P-01G100-A) Refer to ROUSH CleanTech Badge Installation on page **25**.

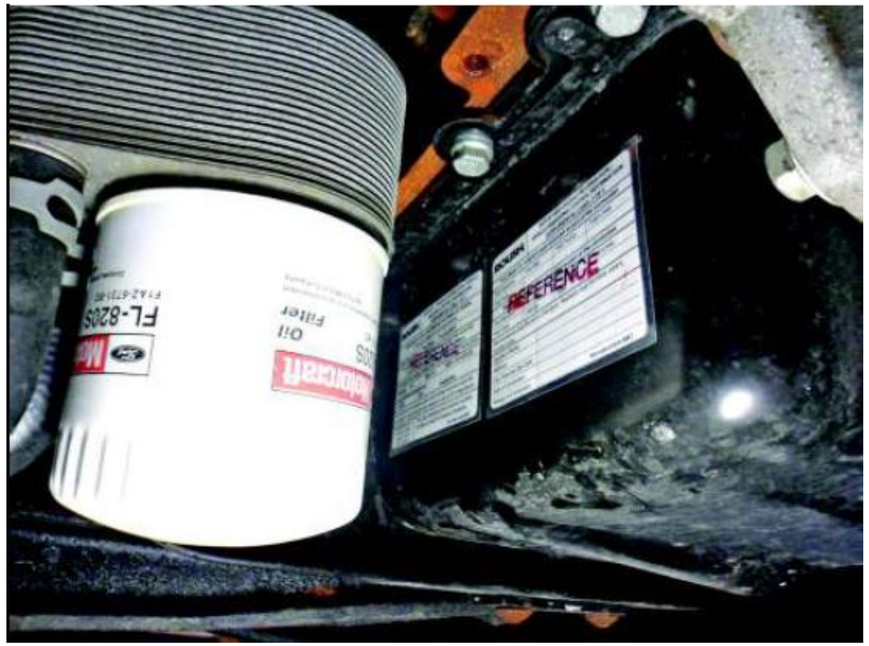


Badges and Labels

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. All labels are found in hardware kit P16JC-LABLES-A.
2. Apply labels in locations shown.

INSTALLING THE VECI LABEL





Your VECI labels will be sent to you after your vehicle has been registered online via the ROUSH Installer Portal. If any assistance is needed with the registration of the vehicle please contact ROUSH CleanTech at **1-800-59-ROUSH (opt 2)**.

E-450 requires 2 sets of VECI labels (4 labels total). One set needs to be applied to the hood, adjacent to the Ford VECI label. The 2nd set needs to be applied to the oil pan.

Note: These labels are vehicle-specific and are required by law to be applied to the vehicle to which they are assigned.

COMPLETING THE KIT INSTALLATION

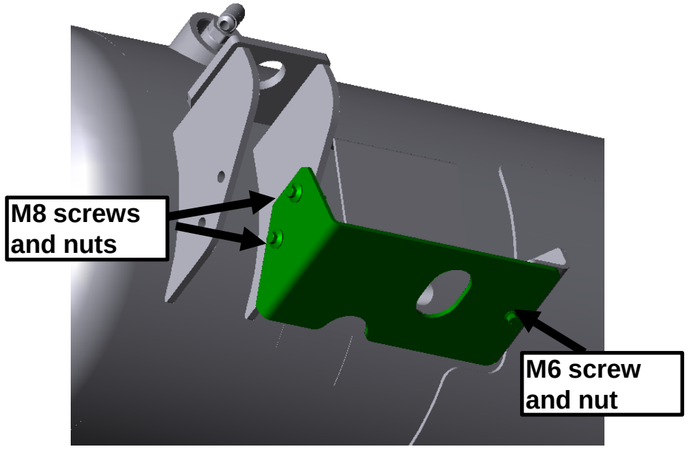
SLEEGERS TANK ONLY

- All Sensors should be installed before flashing PCM.
- If not done, install the left exhaust heat shield over the left catalytic converter.
- Connect RCT harness to the battery, then connect FORD PCM with an adaptor to your computer. Go to- ROUSH CLEANTECH website to flash the PCM/ please use the link http://rdt.roush.com/RoushRdt/.
- Install vehicle battery and connect positive and negative terminals. Tighten to 8–12 Nm.
- Perform system leak check following established ROUSH CleanTech procedure.

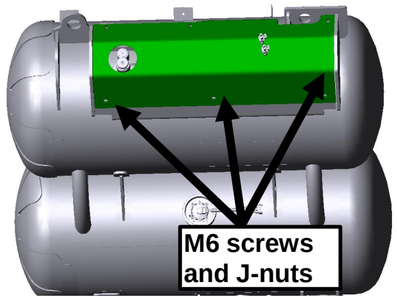
- After system leak check, close the bleeder valve on the tank, and open the remote bleeder valve (if applicable) to evacuate the bleed line. When complete, close the remote bleeder valve as well.

Refer to pictures at right:

- Install LH Fuel Tank valve cover using six M6 screws (W500214-S) and six M6 J-nuts (11-056-0043)
- Install RH Fuel Tank valve cover using 1 M6 screw (W500214-S) and nut (11-278-0274) and 2 M8 screws (N808920-S) and M8 nuts (W701582-S)



- Re-install air induction system and re-connect MAF sensor
- Install engine cover inside the passenger compartment. Latch the four latches



COMPLETING THE KIT INSTALLATION

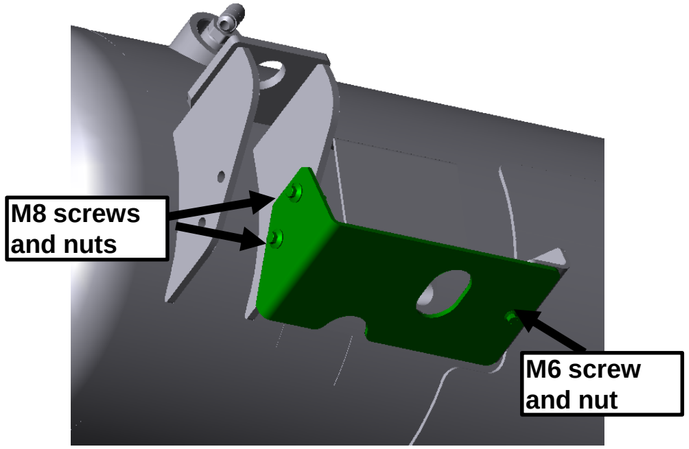
WORTHINGTON TANK ONLY

- All Sensors should be installed before flashing PCM.
- If not done, install the left exhaust heat shield over the left catalytic converter.
- Connect RCT harness to the battery, then connect FORD PCM with an adaptor to your computer. Go to- ROUSH CLEANTECH website to flash the PCM/ please use the link http://rdt.roush.com/RoushRdt/.
- Install vehicle battery and connect positive and negative terminals. Tighten to 8–12 Nm.
- Perform system leak check following established ROUSH CleanTech procedure.

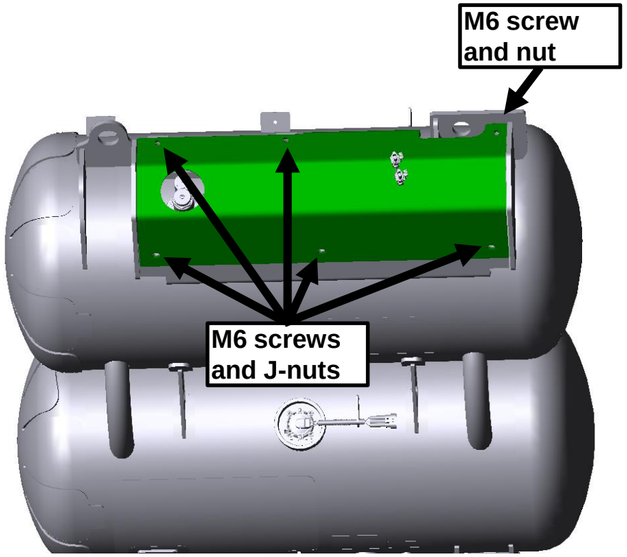
- After system leak check, close the bleeder valve on the tank, and open the remote bleeder valve (if applicable) to evacuate the bleed line. When complete, close the remote bleeder valve as well.

Refer to pictures at right:

- Install LH Fuel Tank valve cover using five M6 screws (W500214-S) and five M6 J-nuts (11-056-0043)
- Install LH Fuel Tank valve cover using one M6 screw (W500215-S) and one M6 nut (W704521-S)
- Install RH Fuel Tank valve cover using 1 M6 screw (W500214-S) and nut (11-278-0274) and 2 M8 screws (N808920-S) and M8 nuts (W701582-S)



- Re-install air induction system and re-connect MAF sensor
- Install engine cover inside the passenger compartment. Latch the four latches



ROUSH CLEANTECH BADGE INSTALLATION

Print this template on 11 x 17 paper set to landscape with scaling set to “None” or to “No Scaling” or original (actual) size at 100%. 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 badge location on the left front fender where indicated by the instructions

ROUSH CLEANTECH BADGE INSTALLATION TEMPLATE

For E-450 Cutaway Custom Body 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 driver-side 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.

ROUSH
CLEANTECH

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.

TORQUE SPECIFICATIONS

Size	Torque
M6 x 16mm screw	8 to 12Nm
M6 x 40mm	8 to 12Nm
M6 x 31mm bolts	8 to 12 Nm
M6 x 25mm bolt	8 to 12 Nm
M6 x 16mm bolt	8- 12 Nm
M6 x 35mm bolt	8-12 Nm
M6 X 1 X 2 mm	8-12 Nm
M6X1X20 mm	8-12 Nm
M6X1X25 mm	8-12 Nm
M6x1x31 mm	8-12 Nm
M12X1.75X55 mm	100 to110Nm
M12X1.75X35 mm	100 to110Nm

Appendix

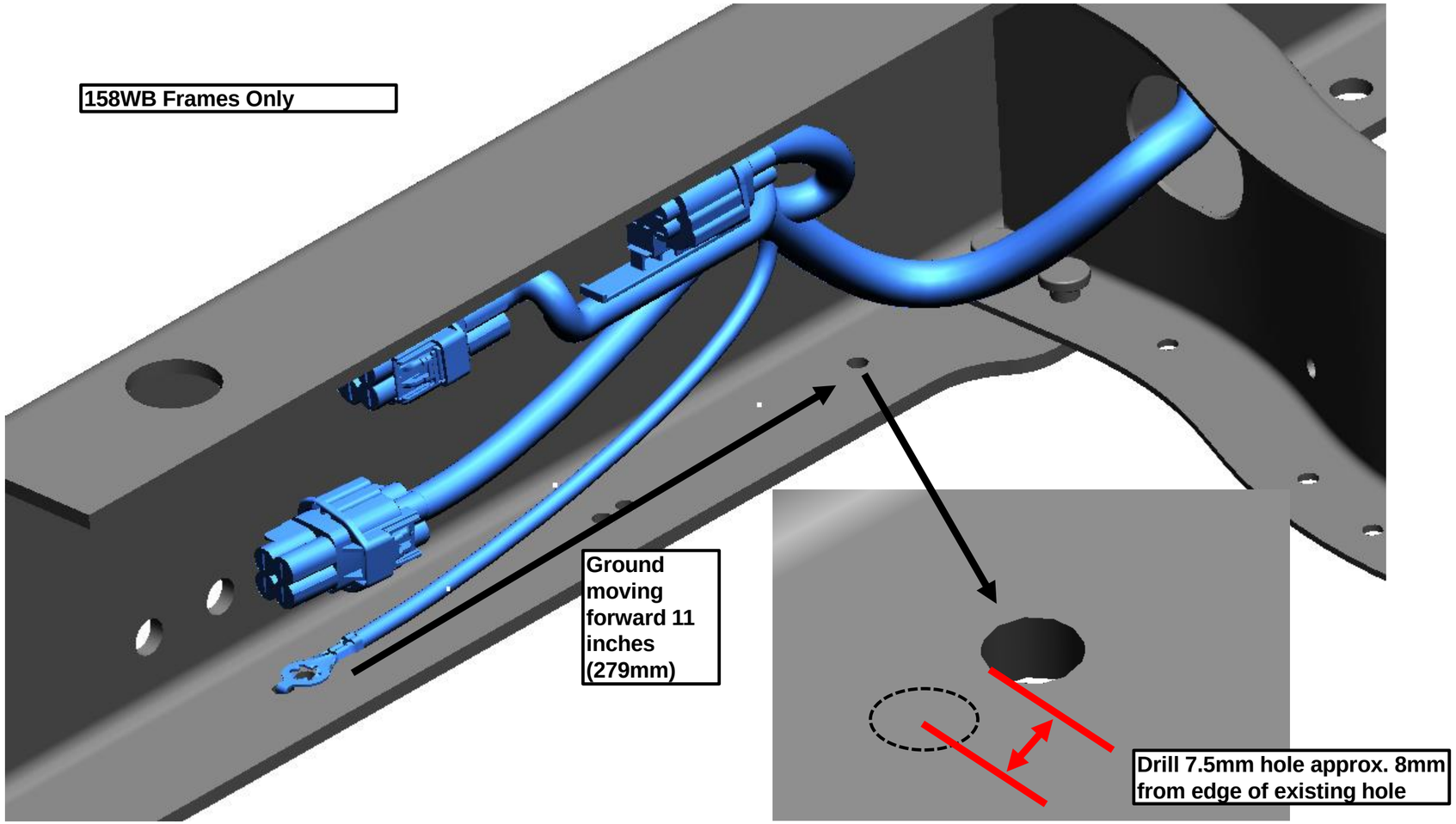
Rear Crossmember Position Modification for Fuel Tank

The fuel tank installation for the Roush CleanTech LPG system for the extended range tank for both the 158" wheelbase and 176" wheelbase E-450's must have the OEM rear crossmember moved to a position that allows for installation of the fuel tank. The crossmember must be moved rearward approximately 14 inches (355mm) to accomplish fuel tank installation and maintain frame rigidity and integrity.

Wire Harness Ground Relocation
Applies to 158WB Frames Only

1. **Remove the ground connection on the bottom flange of rear frame rail. Save ground lug screw for reuse.**
2. **Locate hole approximately 11 inches (279mm) forward of existing ground hole. This will be the anti-rotation hole for the ground eyelet tab.**
3. **Drill a 0.295 inch (7.5mm/size M) hole next to this hole approx. 8mm from edge of existing hole. This will be the grounding hole which the self-tapping screw will attach to.**
4. **Attach self-tapping grounding screw to newly made hole.**

The frame must be free of rust, paint, primer and corrosion. The surface must have a bright polished appearance immediately before the ground terminal is connected.



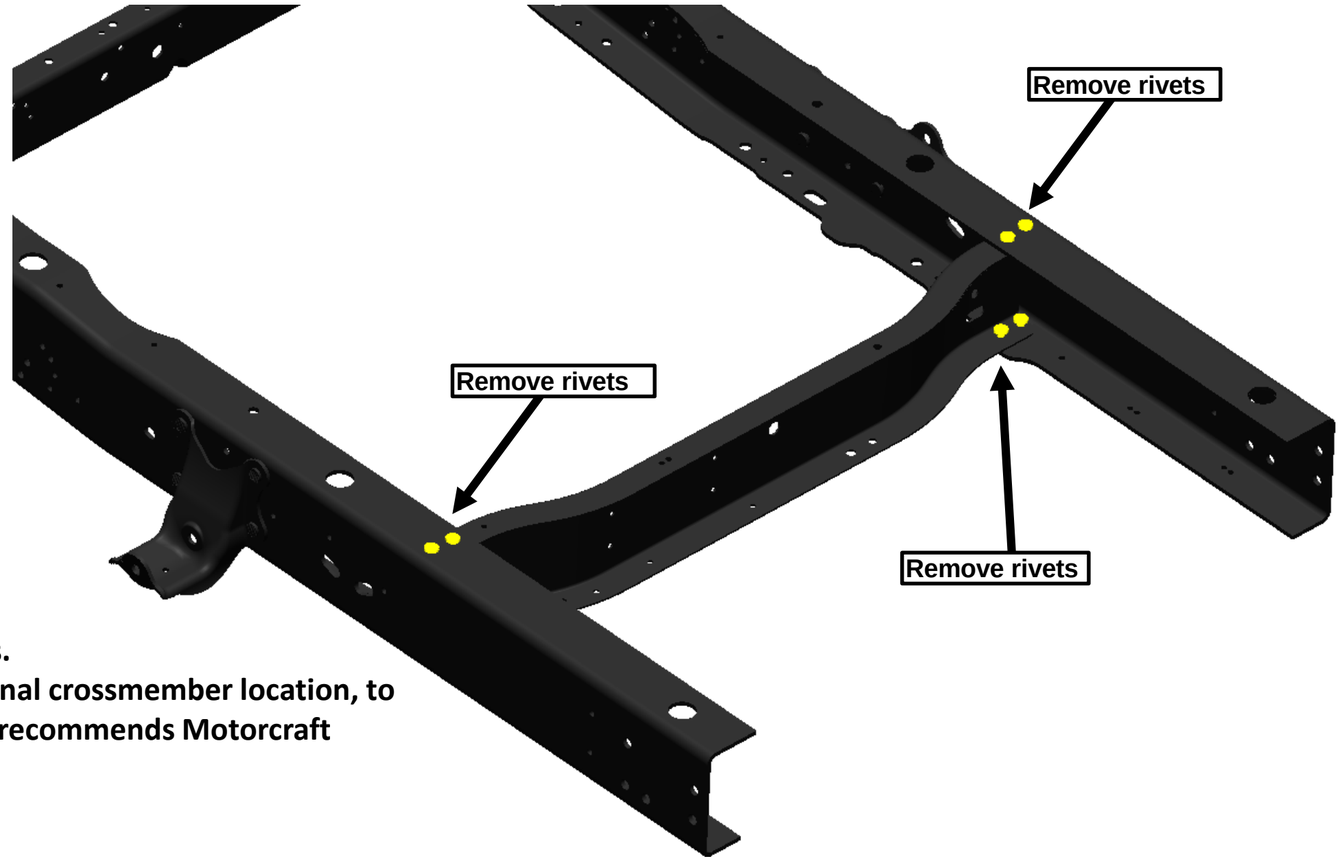
DISCARD REUSE NEW

Remove the rear crossmember (158WB only)

Remove the rivets securing the crossmember to the frame side rails. Do the following:

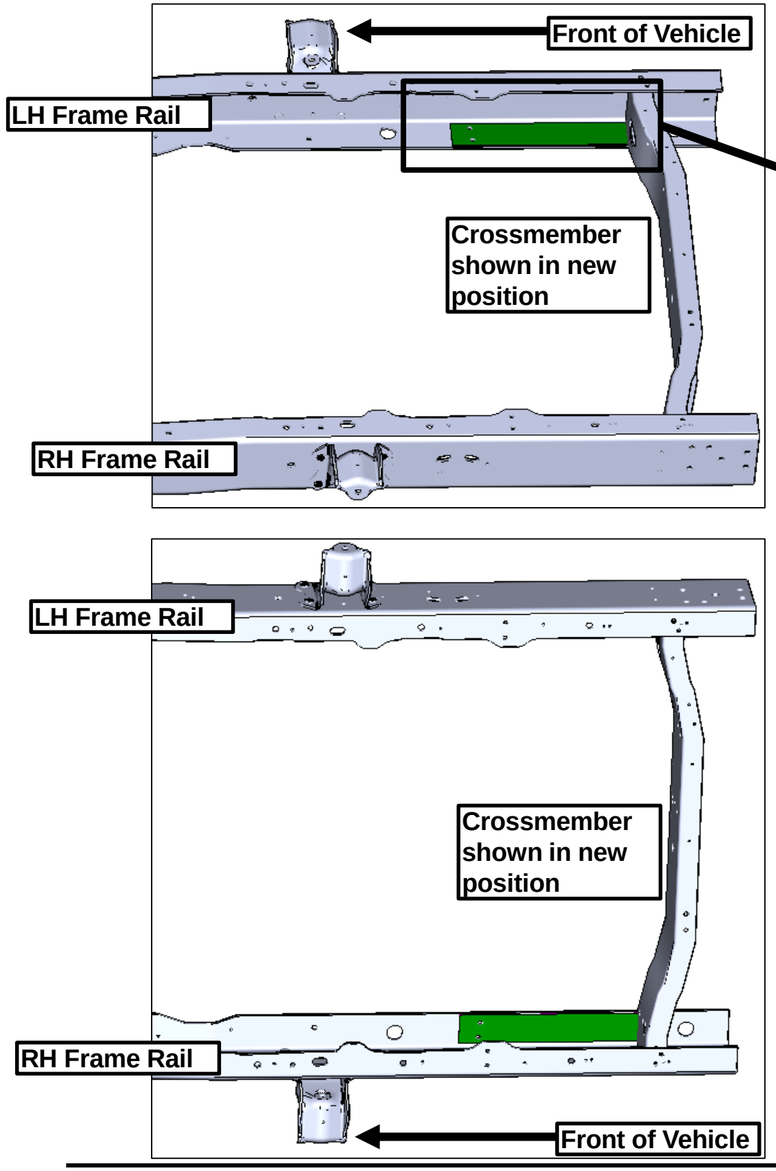
Caution: Wear safe eye and ear protection when grinding, cutting and punching rivets to avoid serious personal injury.

Caution: Be careful while grinding or punching out rivets. Do not elongate or distort crossmember or frame side rail rivet holes. Do not grind on the crossmember or frame side rails. This can cause a loose or misaligned crossmember. Damage to components can result.

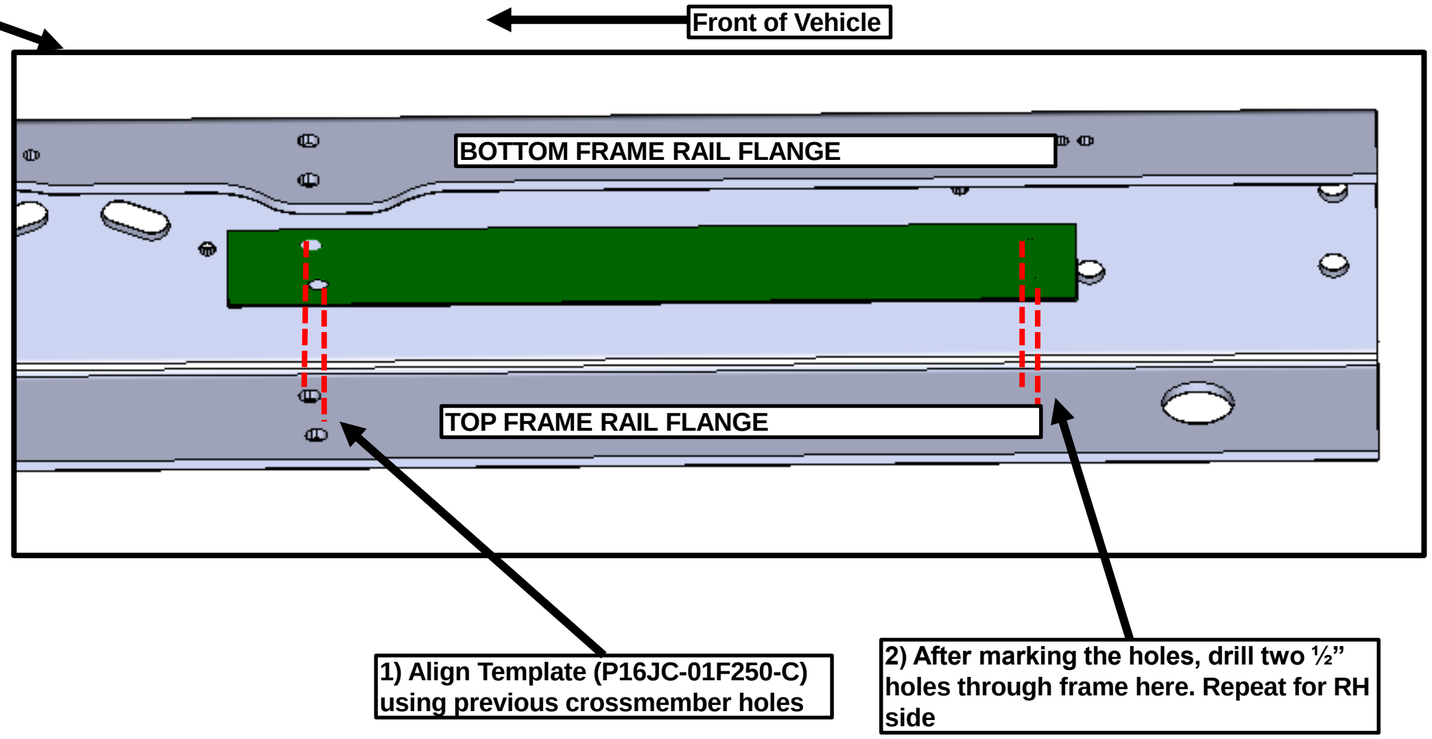


1. **Remove all 8 rivets from rear crossmember.**
2. **Separate the rear crossmember from the frame side rails.**
3. **Deburr and apply a rust preventative coating to the original crossmember location, to include the frame rails and rivet holes. Roush CleanTech recommends Motorcraft Premium Undercoating (PM-25A)**

Align Template On The Inside Of The Top Frame Flange (158WB only)



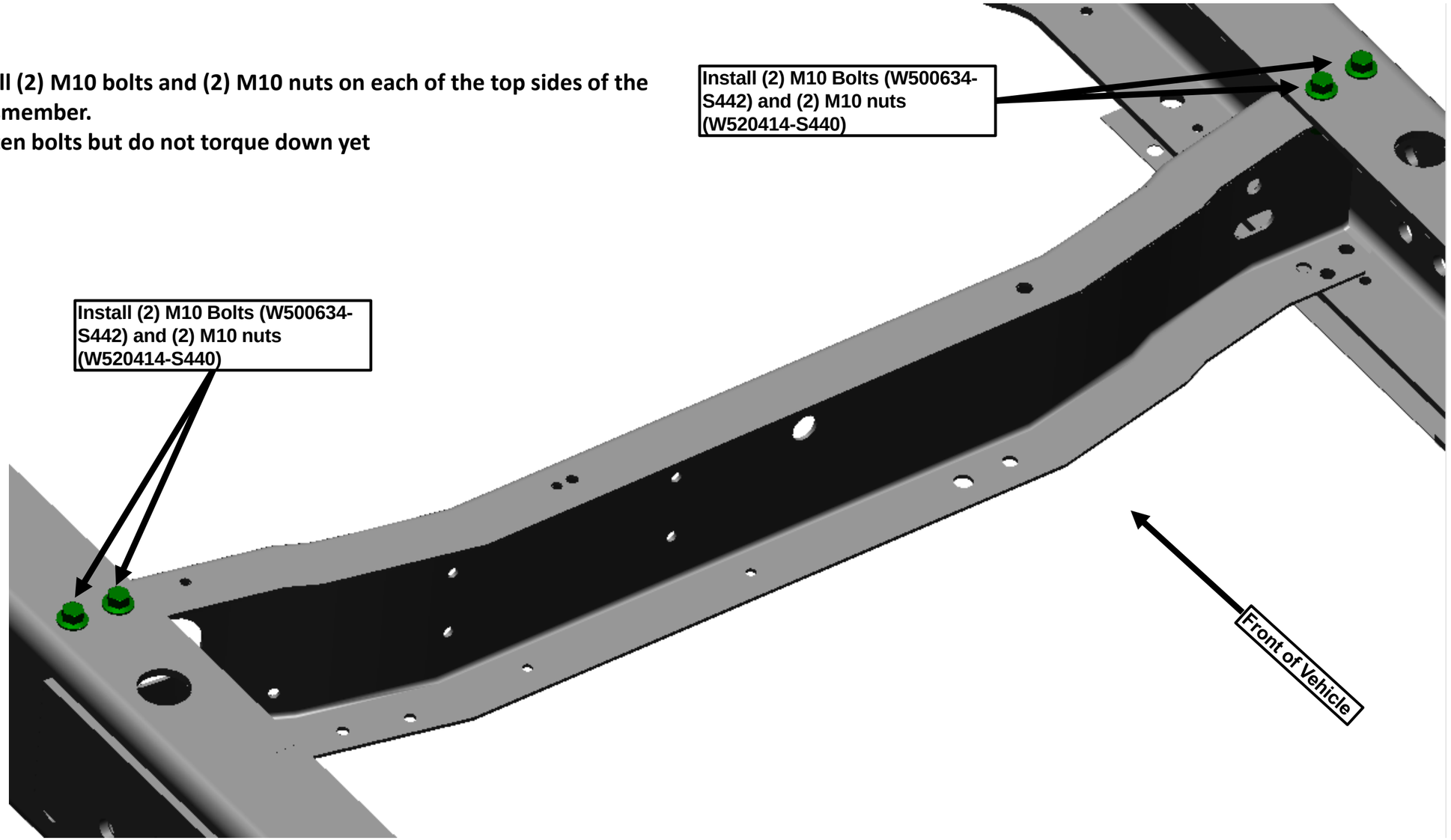
Note: ALL VIEWS ARE LOOKING UP FROM UNDERNEATH THE VEHICLE



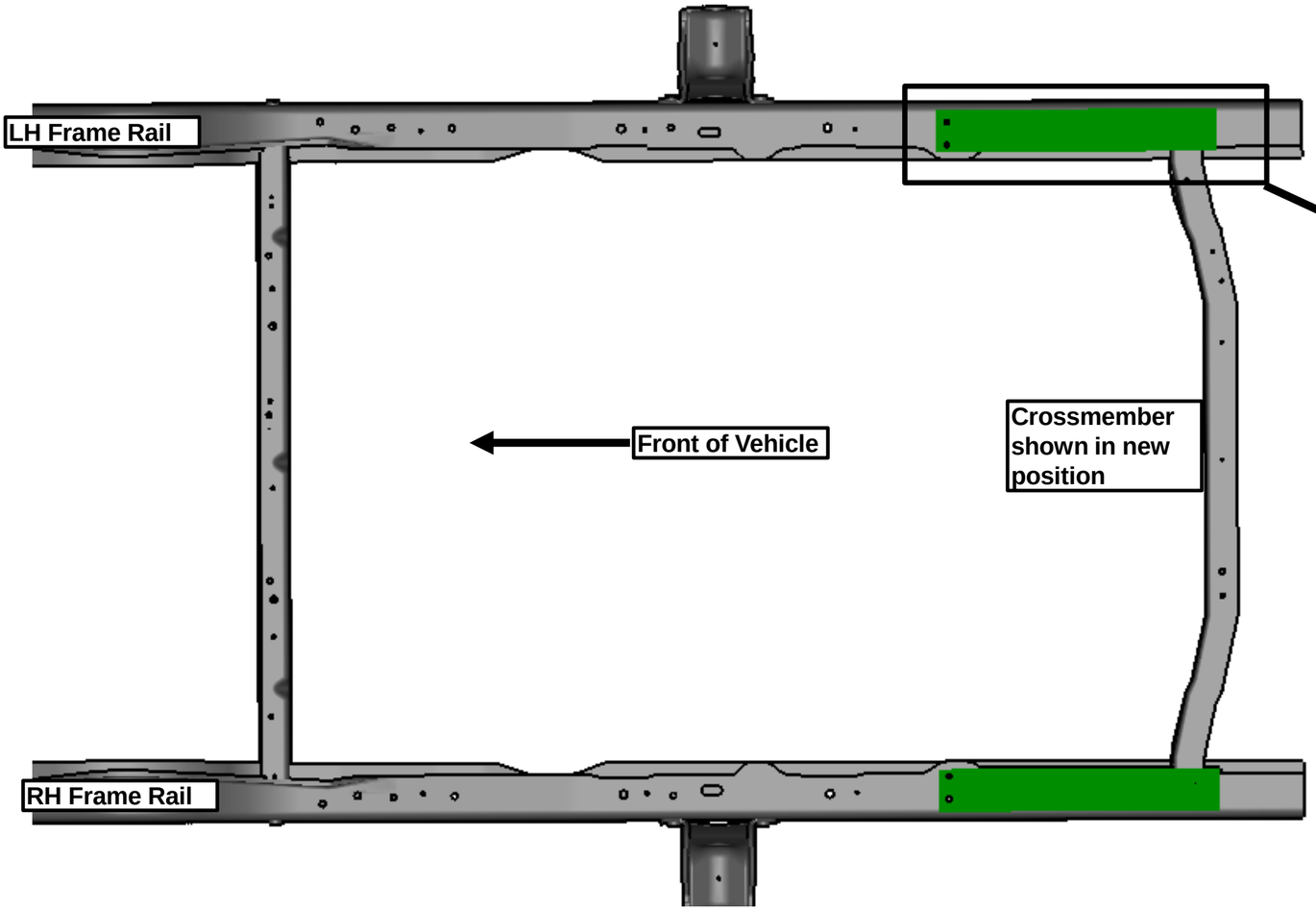
Note: Read all instructional text on template, careful to use the correct side of the template depending on which frame rail you are modifying.

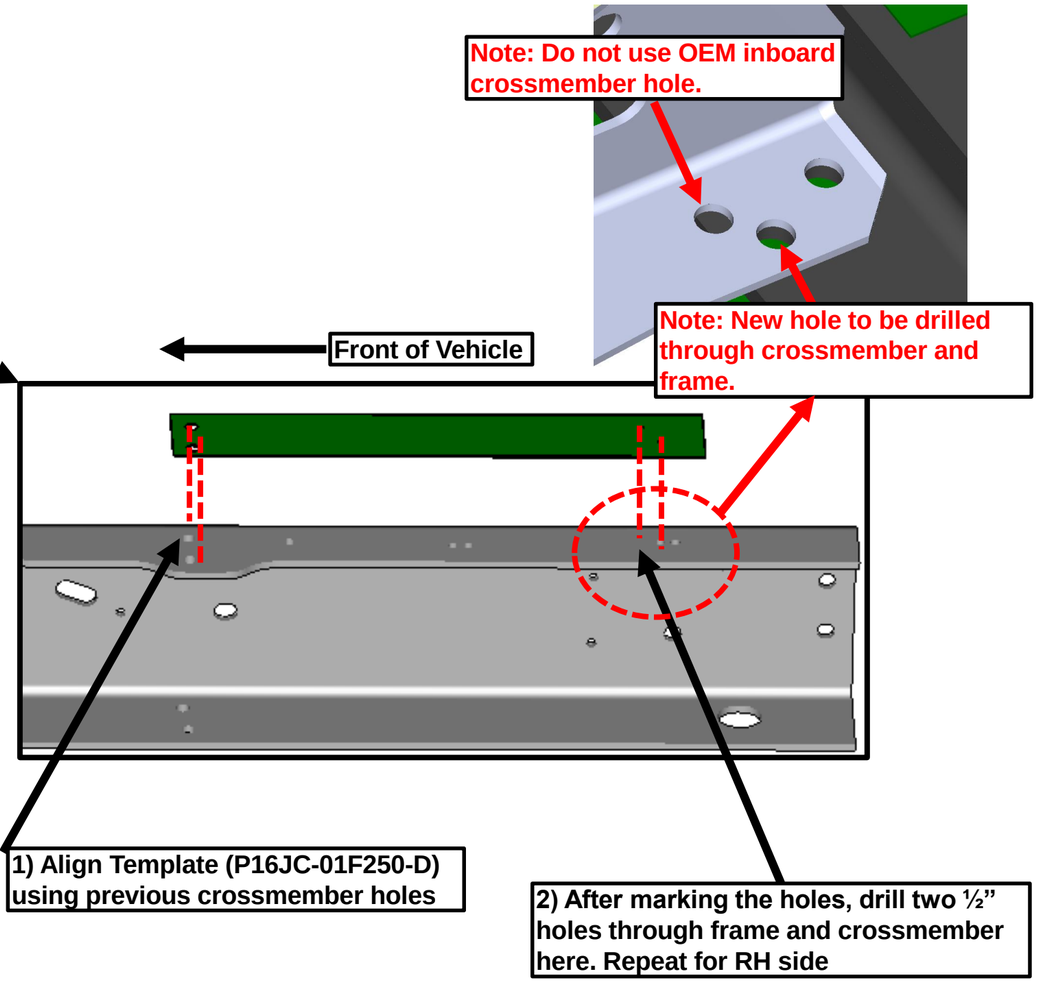
Tighten Fasteners on Frame Top (158WB only)

1. **Install (2) M10 bolts and (2) M10 nuts on each of the top sides of the crossmember.**
2. **Tighten bolts but do not torque down yet**



Align Template on Frame Bottom (158WB only)

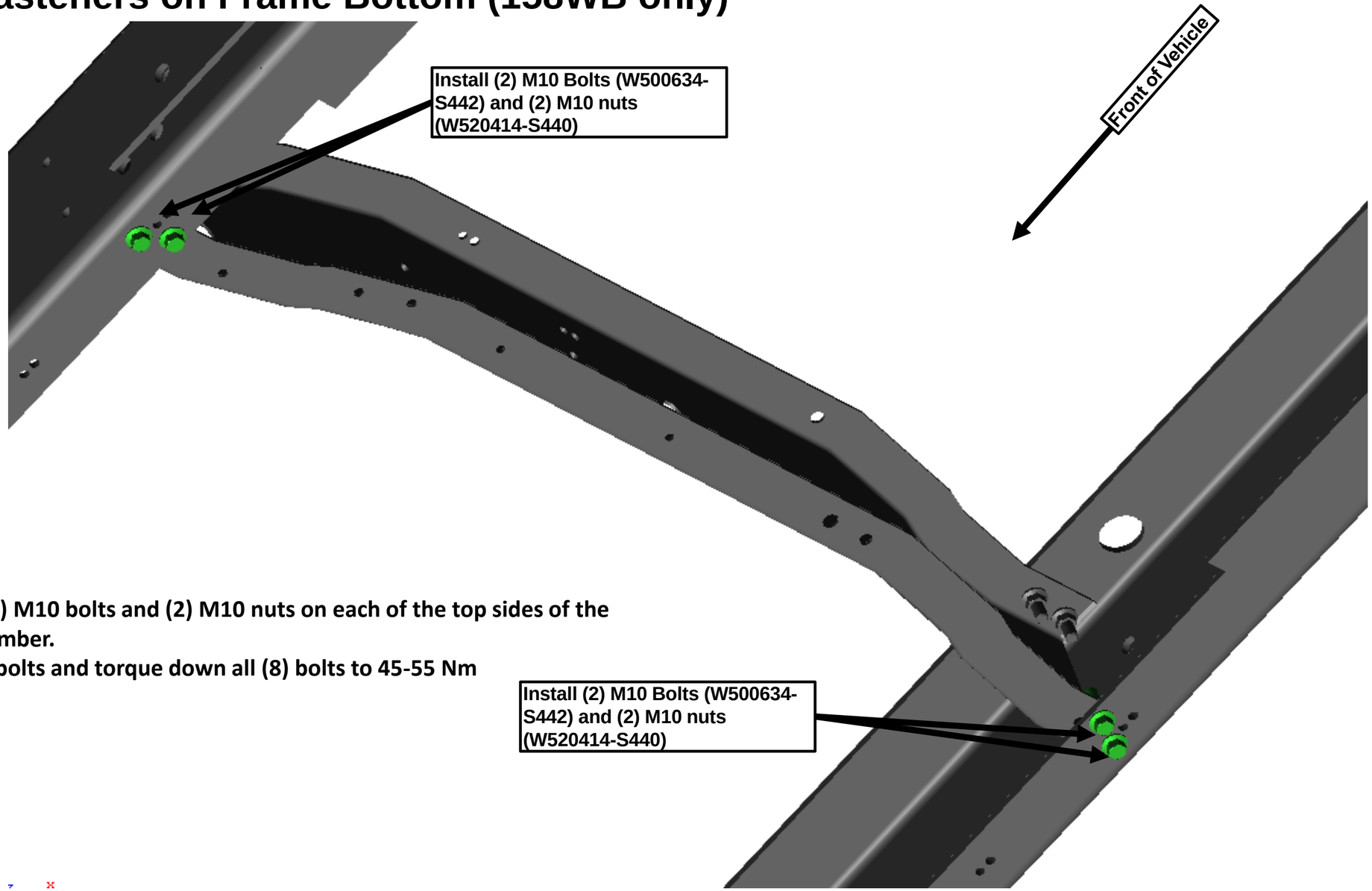




Note: ALL VIEWS ARE LOOKING UP FROM UNDERNEATH THE VEHICLE

Note: Read all instructional text on template, careful to use the correct side of the template depending on which frame rail you are modifying.

Tighten Fasteners on Frame Bottom (158WB only)



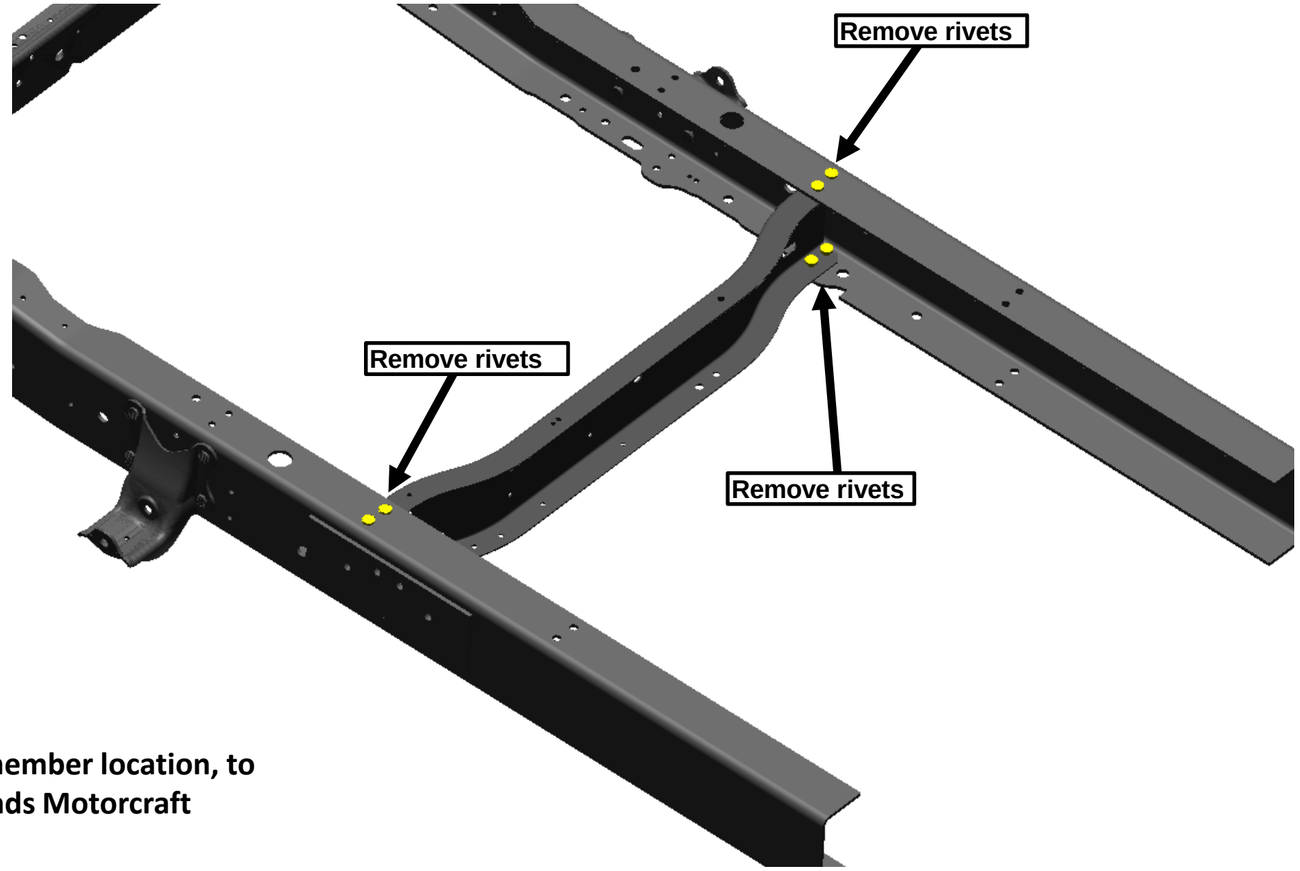
1. Install (2) M10 bolts and (2) M10 nuts on each of the top sides of the crossmember.
2. Tighten bolts and torque down all (8) bolts to 45-55 Nm

Remove the rear crossmember (176WB only)

Remove the rivets securing the crossmember to the frame side rails. Do the following:

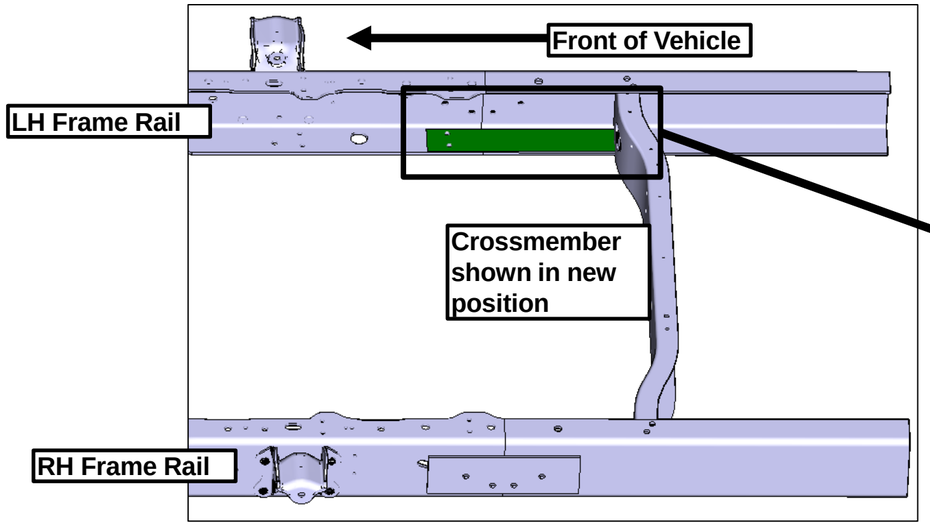
Caution: Wear safe eye and ear protection when grinding, cutting and punching rivets to avoid serious personal injury.

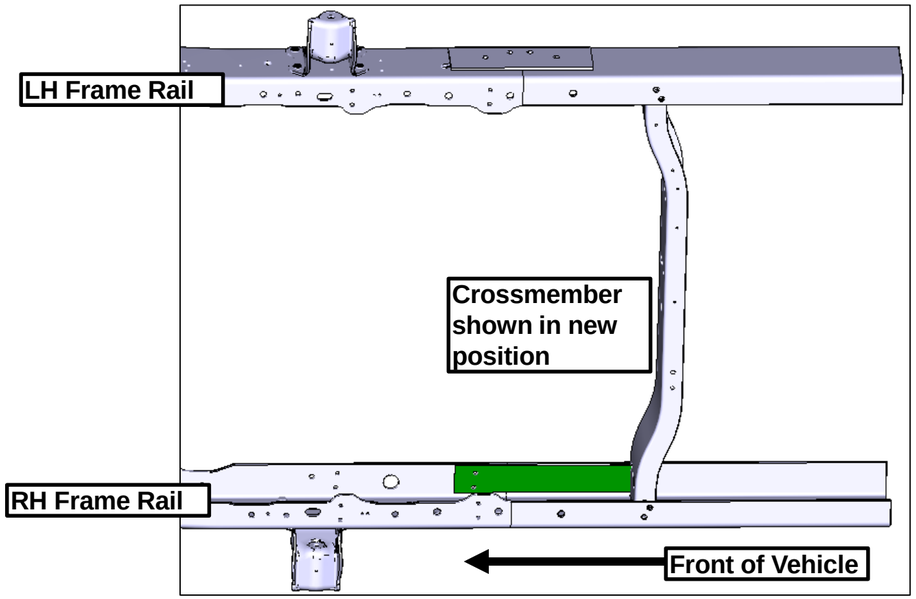
Caution: Be careful while grinding or punching out rivets. Do not elongate or distort crossmember or frame side rail rivet holes. Do not grind on the crossmember or frame side rails. This can cause a loose or misaligned crossmember. Damage to components can result.



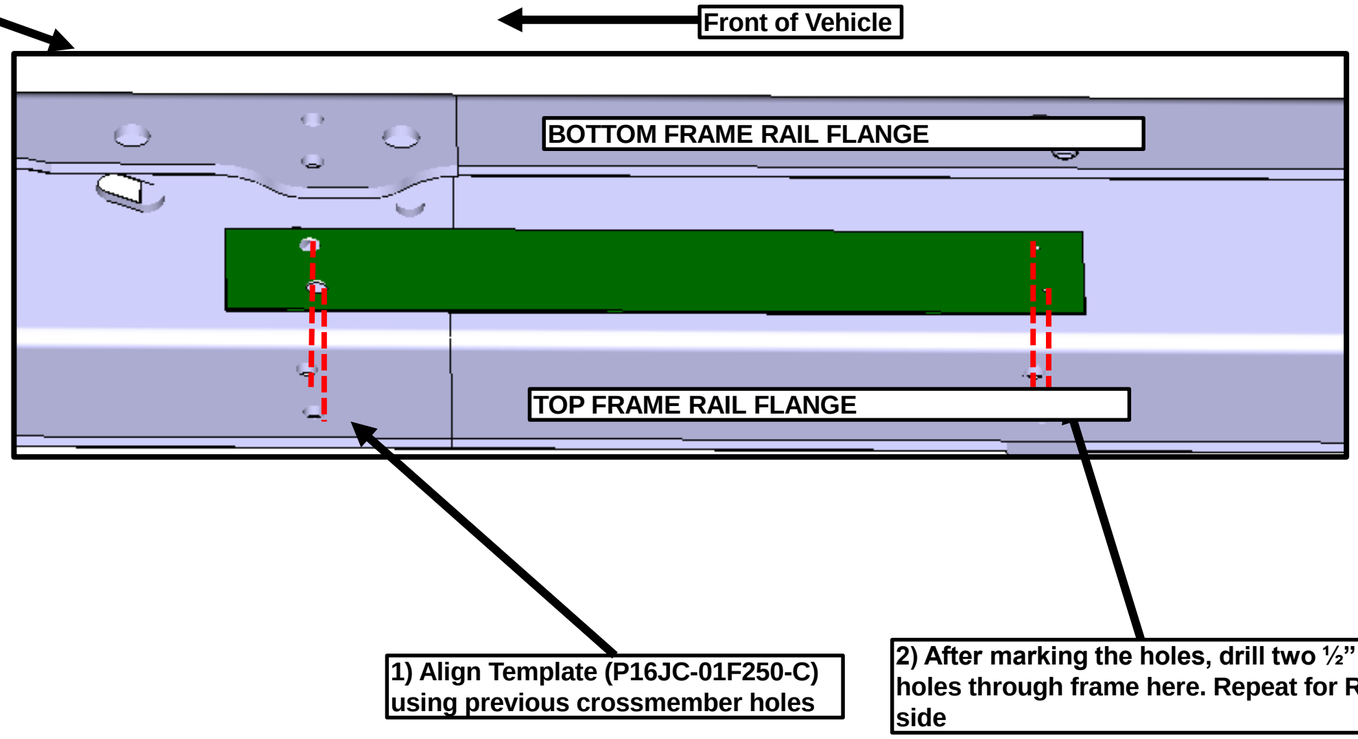
1. **Remove all 8 rivets from rear crossmember.**
2. **Separate the rear crossmember from the frame side rails.**
3. **Deburr and apply a rust preventative coating to the original crossmember location, to include the frame rails and rivet holes. Roush CleanTech recommends Motorcraft Premium Undercoating (PM-25A)**

Align Template On The Inside Of The Top Frame Flange (176WB only)





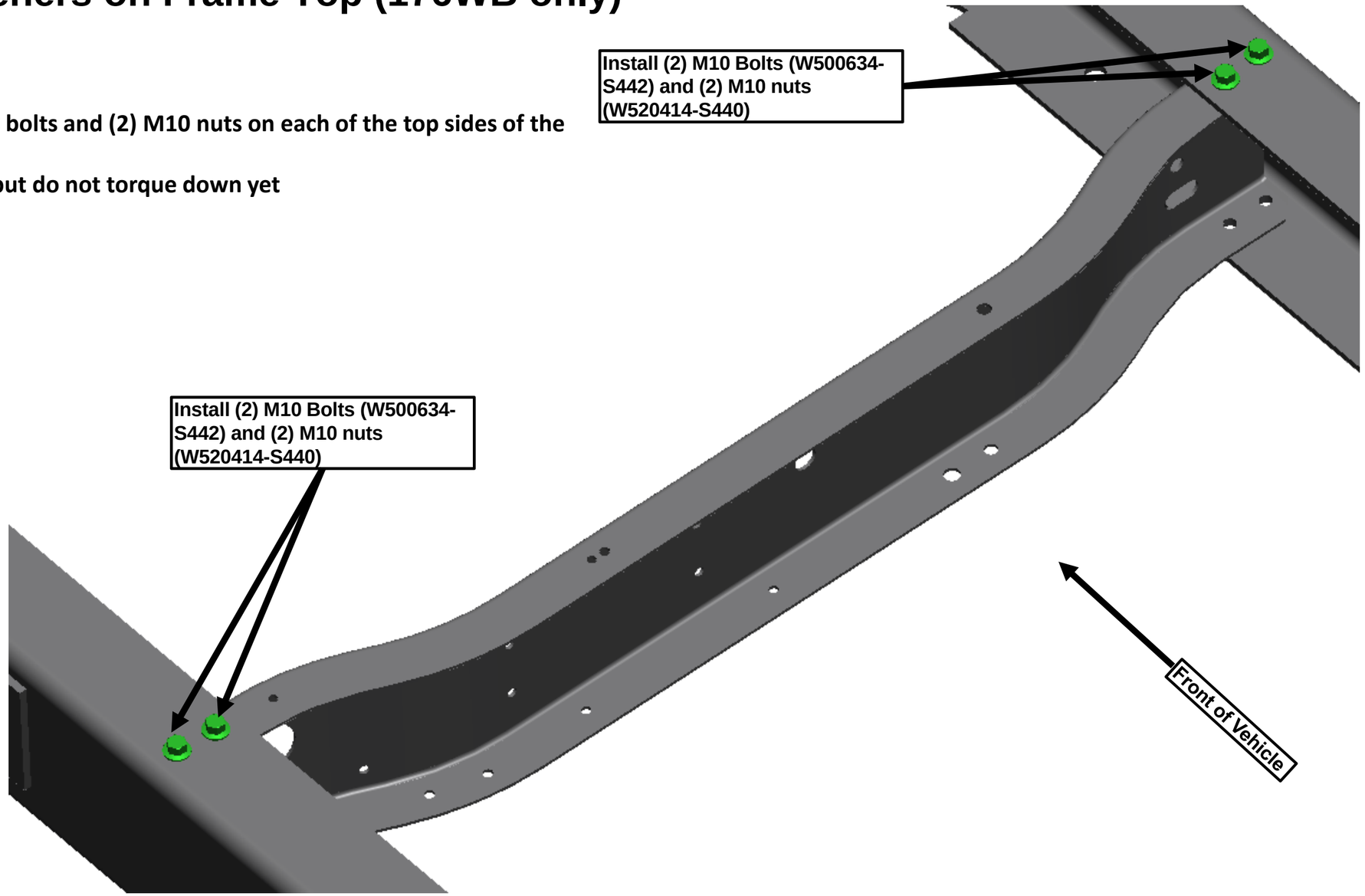
Note: ALL VIEWS ARE LOOKING UP FROM UNDERNEATH THE VEHICLE



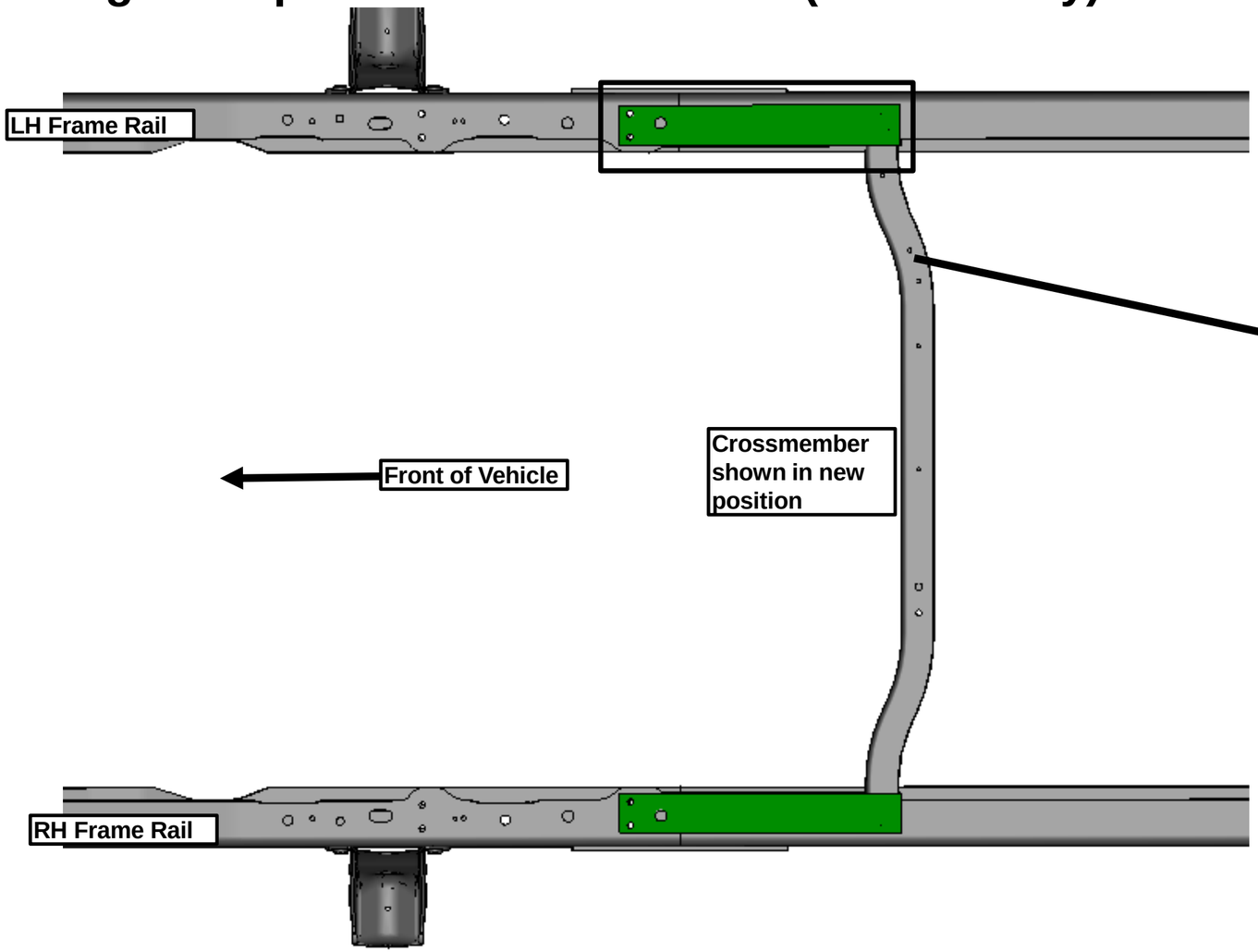
Note: Read all instructional text on template, careful to use the correct side of the template depending on which frame rail you are modifying.

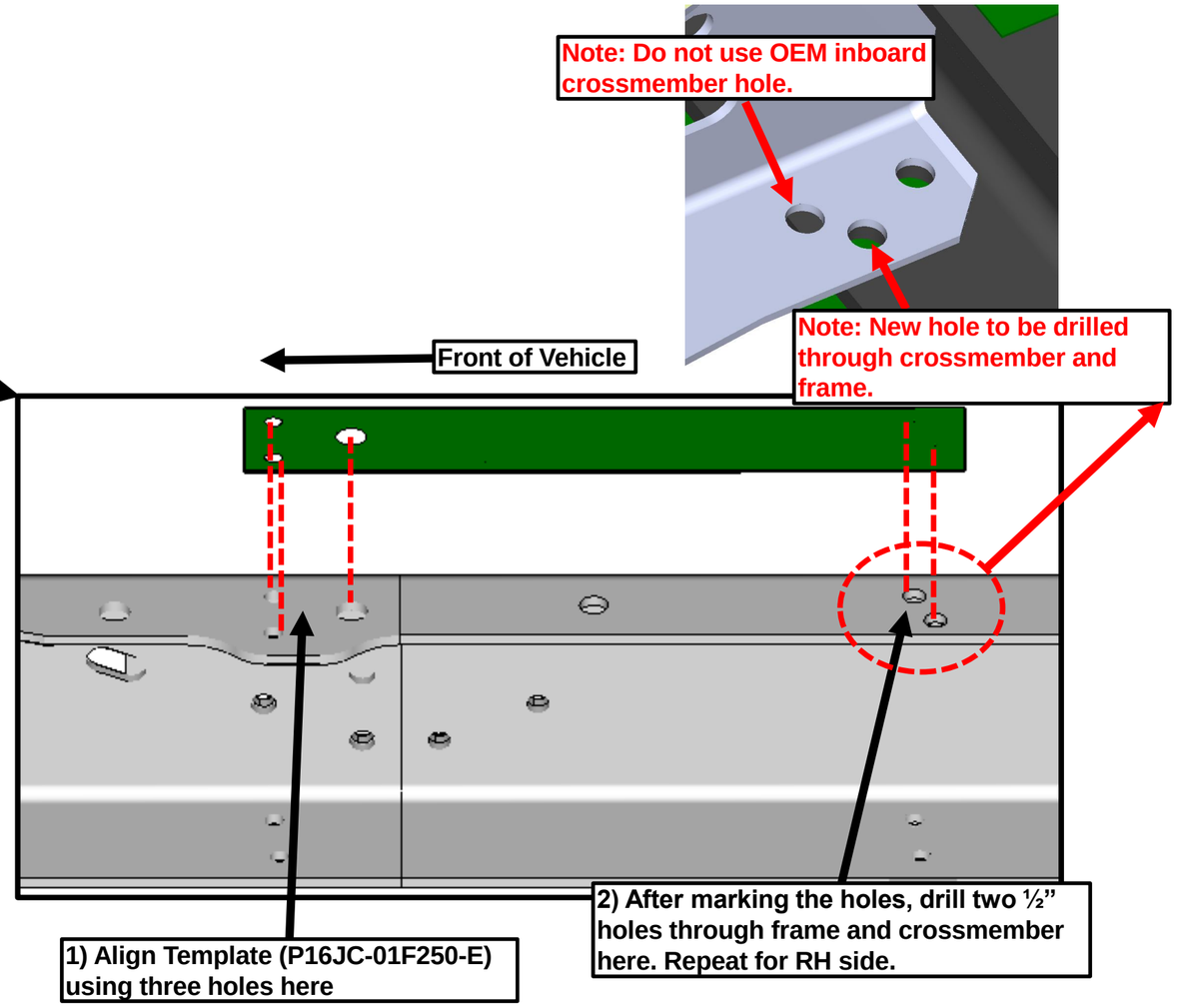
Tighten Fasteners on Frame Top (176WB only)

1. Install (2) M10 bolts and (2) M10 nuts on each of the top sides of the crossmember.
2. Tighten bolts but do not torque down yet



Align Template on Frame Bottom (176WB only)

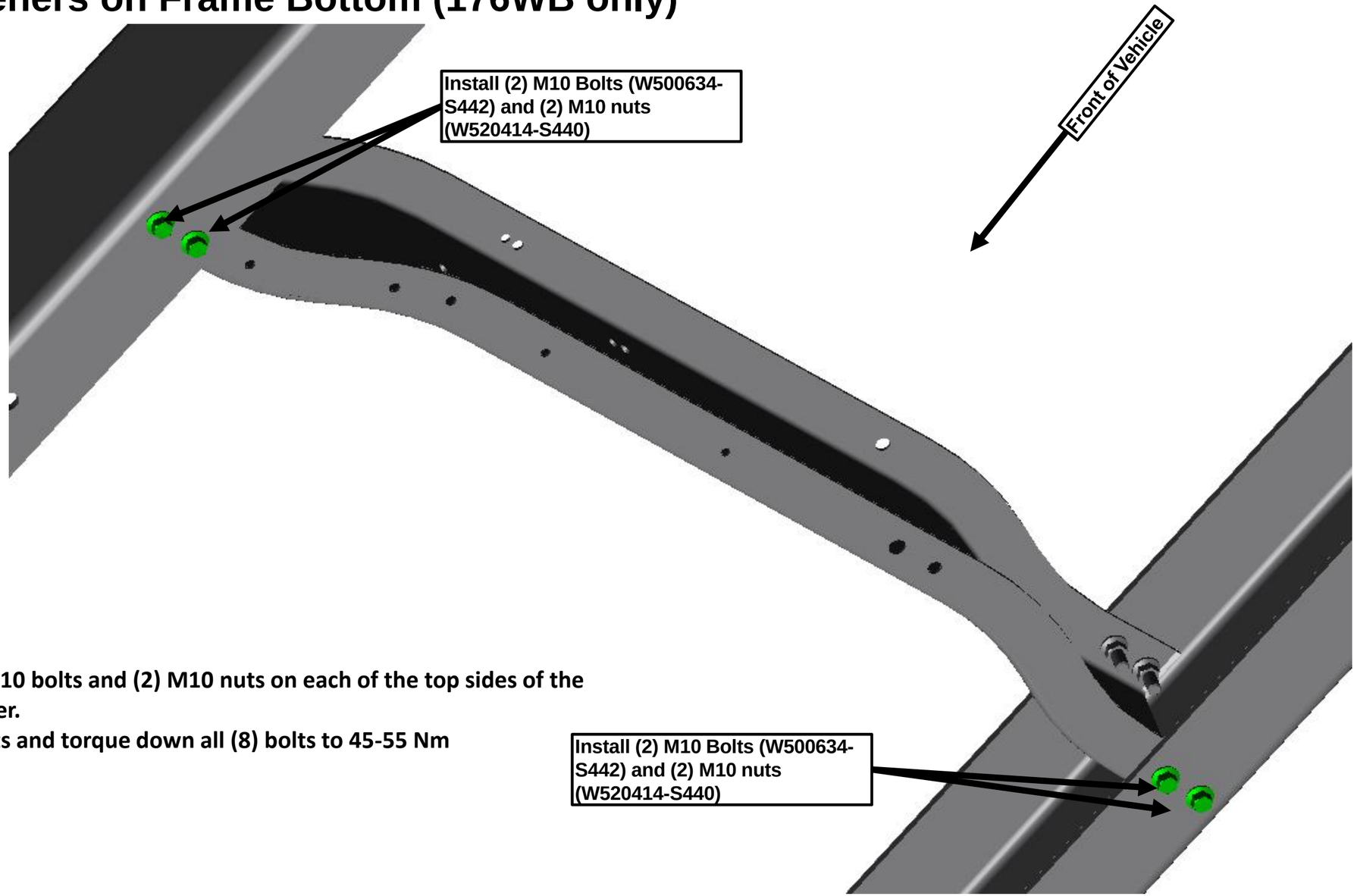




Note: ALL VIEWS ARE LOOKING UP FROM UNDERNEATH THE VEHICLE

Note: Read all instructional text on template, careful to use the correct side of the template depending on which frame rail you are modifying.

Tighten Fasteners on Frame Bottom (176WB only)

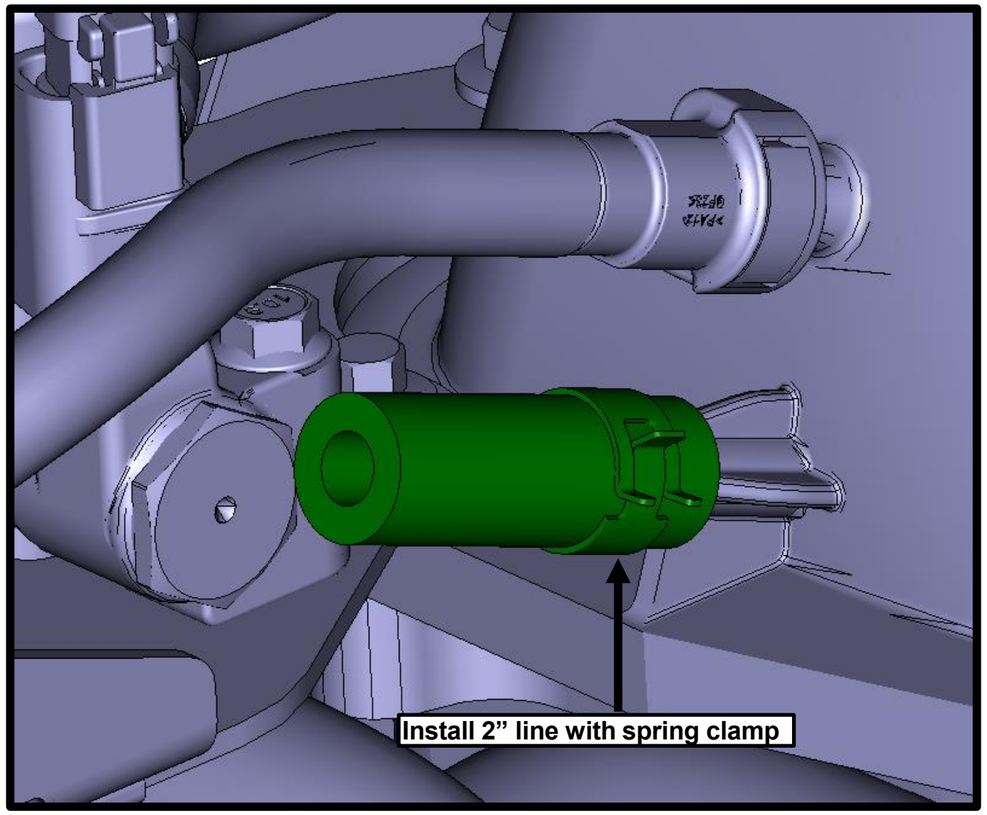


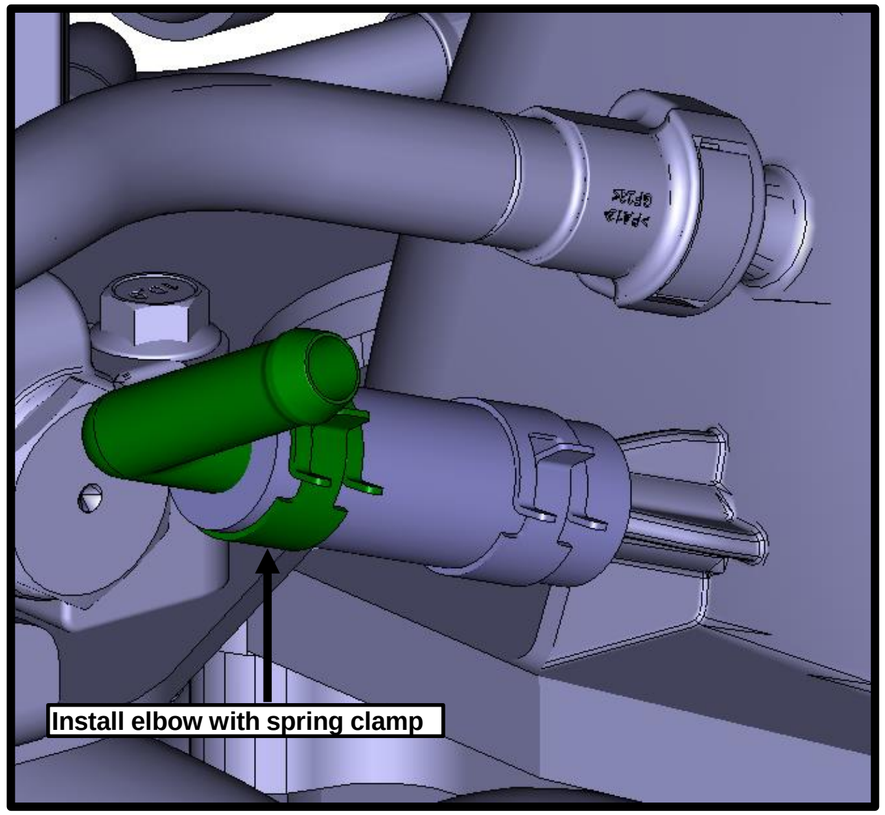
1. Install (2) M10 bolts and (2) M10 nuts on each of the top sides of the crossmember.
2. Tighten bolts and torque down all (8) bolts to 45-55 Nm

Appendix
Vacuum Booster Line Modification for E-350 Single Rear Wheel

1. **Install 2” vacuum line (27232-52) with new spring clamp (382984-S100)**
2. **Install 90° barb elbow (11-126-0670) with spring clamp as shown.**

Note: ensure elbow is pushed completely onto hose



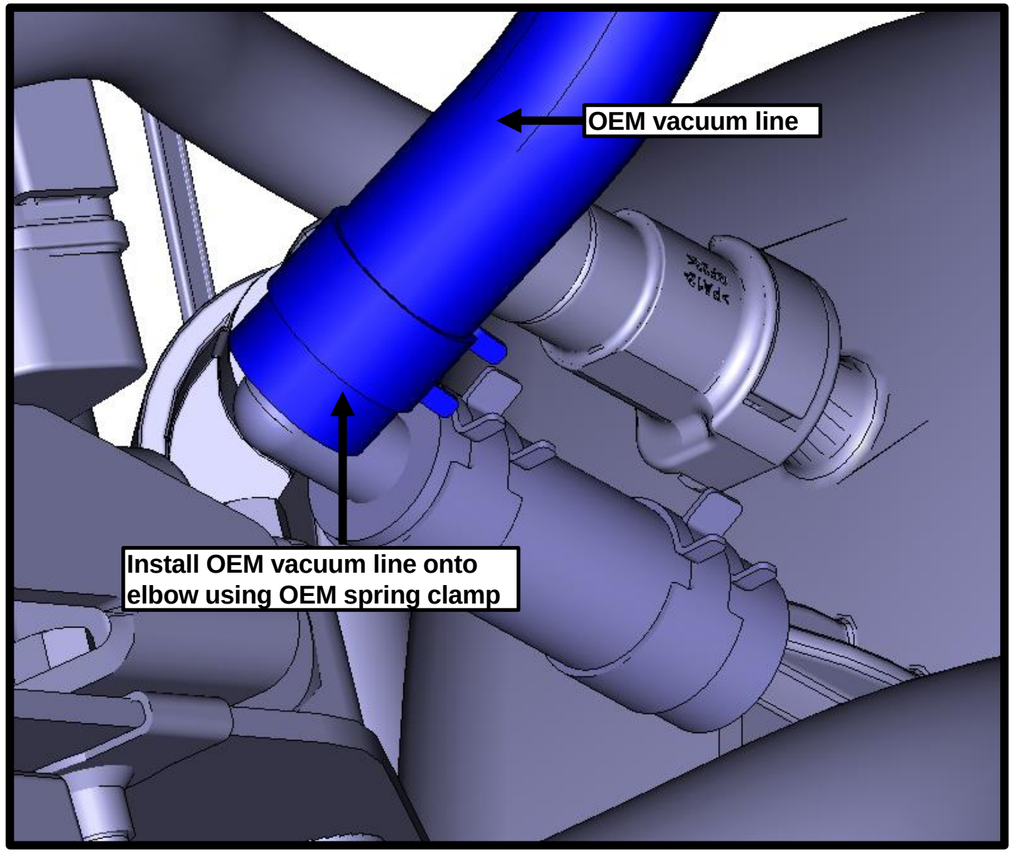


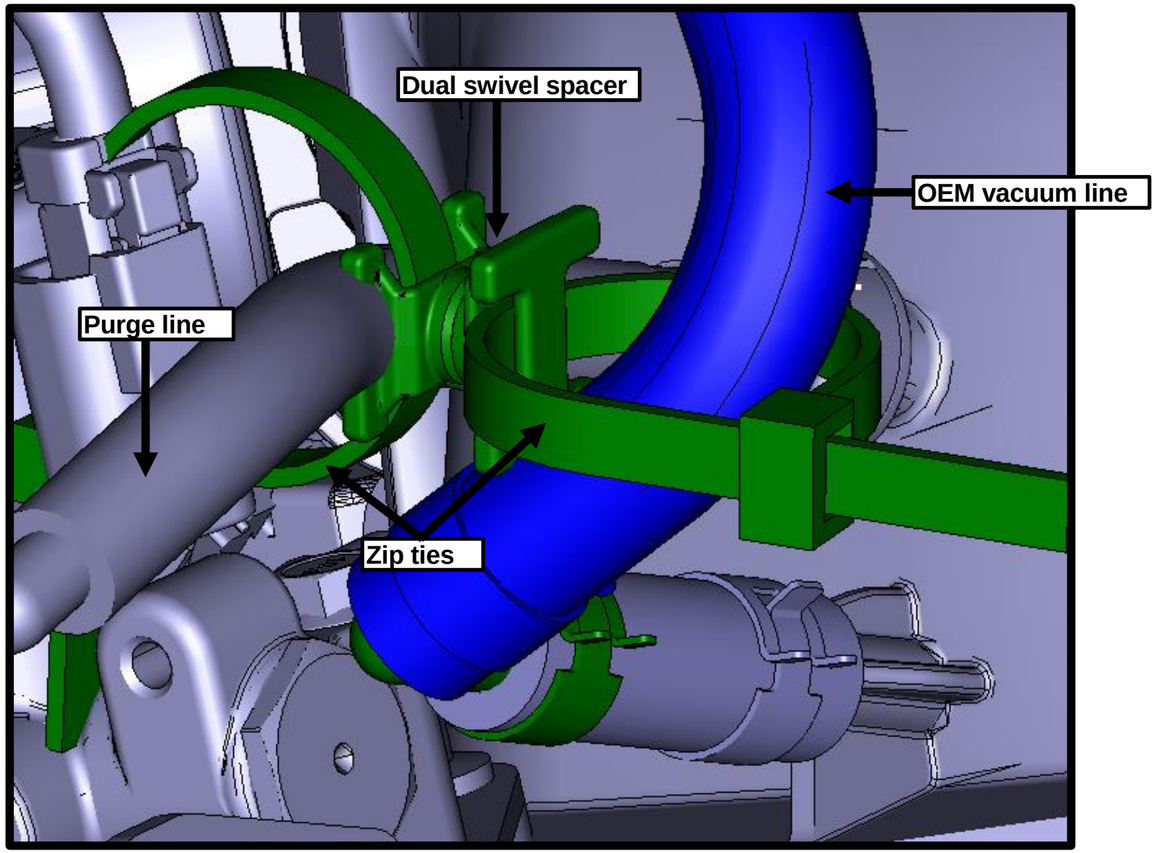
Vacuum Booster Line Modification for E-350 Single Rear Wheel

1. **Install OEM vacuum line onto elbow with OEM spring clamp as shown.**

Ensure vacuum line is pushed completed onto elbow

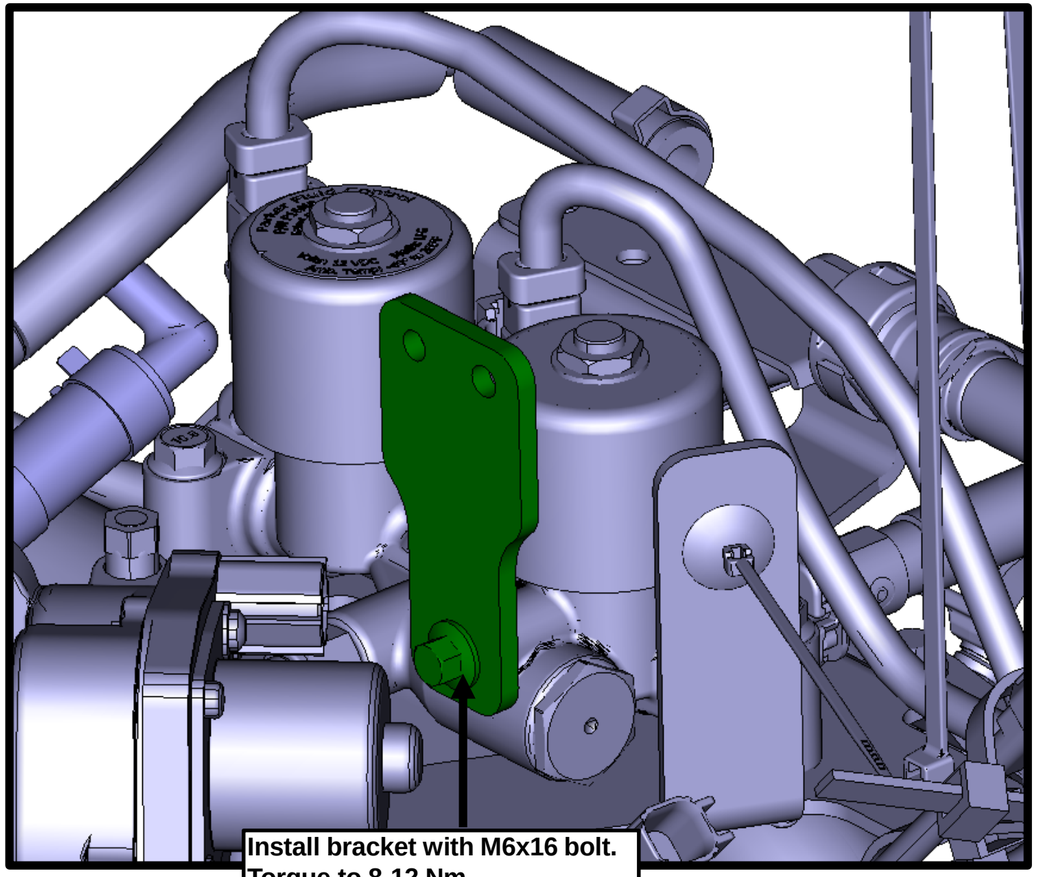
2. **Install dual swivel clip (151-06500) with 2 zip ties (20-403-0003) to retain OEM vacuum line away from purge line as shown**

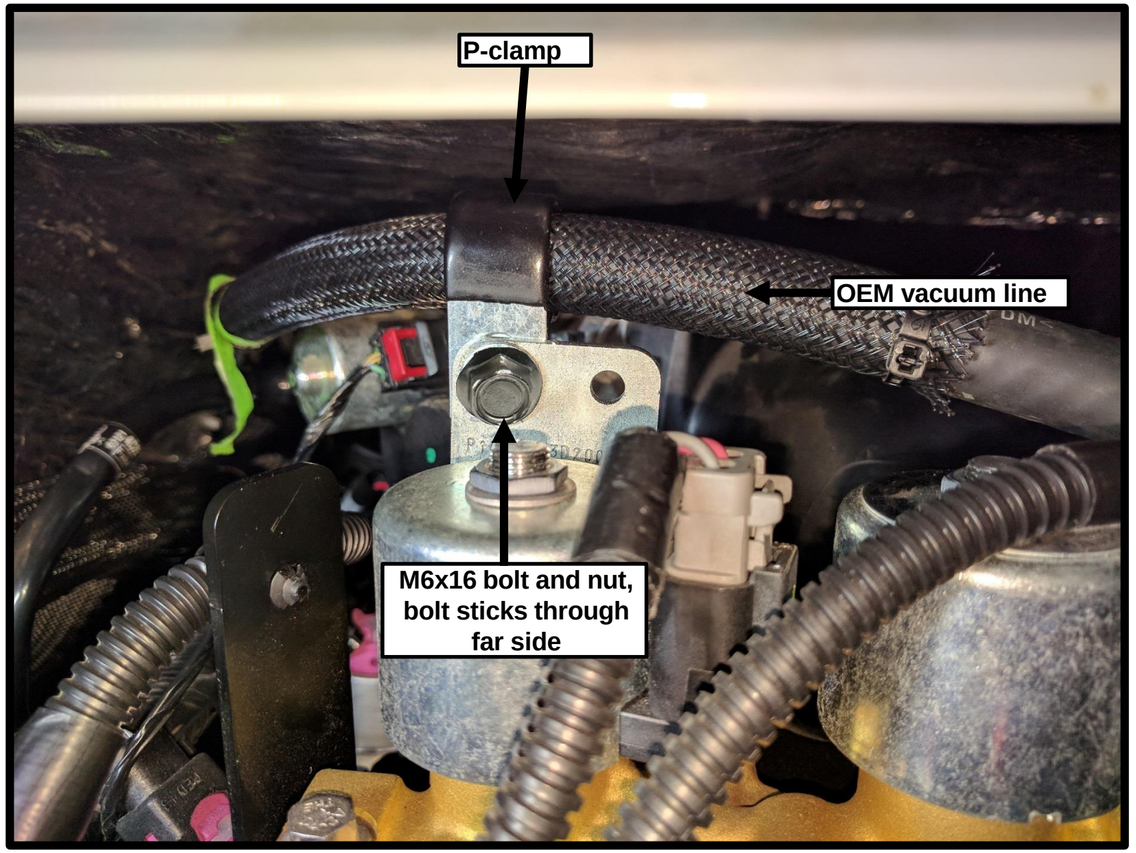




Vacuum Booster Line Modification for E-350 Single Rear Wheel

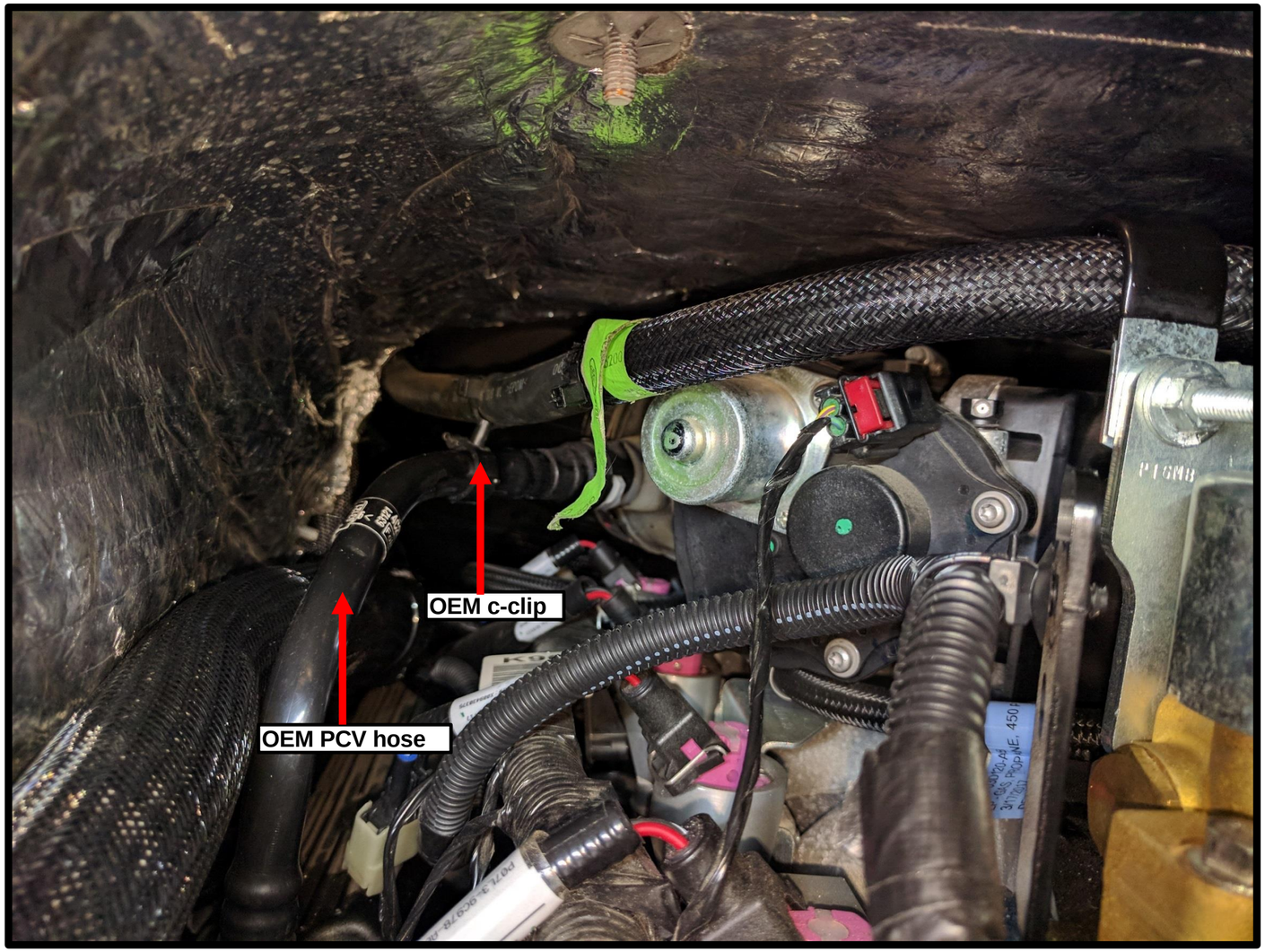
1. On back side of FRPCM, install bracket (P16MB-03D200-B) using M6x16 bolt (W500213-S437) in orientation as shown. Torque to 8-12 Nm.
2. Install 3/4” p-clamp (11-056-0042) to OEM vacuum line and then install p-clamp to bracket using M6x16 bolt (W500213-S437) and M6 nut (11-278-0274)





Vacuum Booster Line Modification for E-350 Single Rear Wheel

1. **Ensure OEM c-clip is clipped to PCV hose as shown below**



Revision History		
-AA	Initial Release	12/2017