



Propane Fuel Line Routing

RECALL

**Models Affected: Certain 2015 through 2017 Model Year Vision Buses
Equipped with Propane Engines**

ISSUE

Propane fuel lines may be crossed and/or rubbing. Crossed and/or rubbing fuel lines may become damaged from movement and develop a leak.

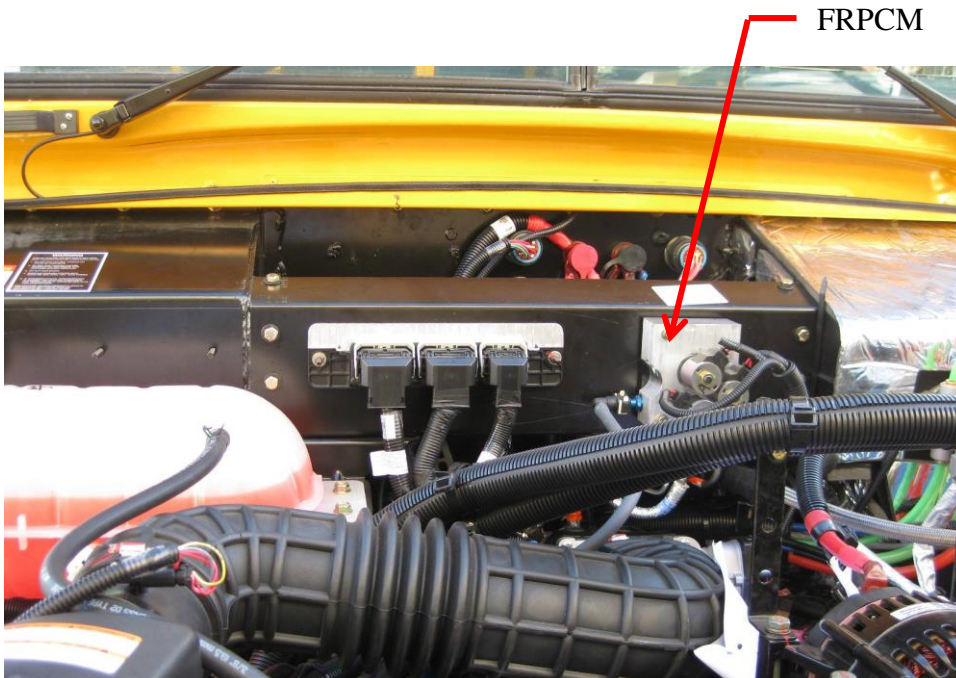
CORRECTIVE ACTION

Inspect fuel lines and if necessary reroute propane fuel lines to ensure the lines are secured parallel and are not rubbing. Replace any damaged fuel line(s).

INSPECTION

WARNING: Always follow all Federal, State, Local and Shop safety standards and use proper safety equipment, and thoroughly read and understand all instructions before performing these procedures.

1. Park bus on level surface, apply parking brake, turn off ignition, remove key, and chock wheels.
2. Disconnect batteries.
3. Open hood and locate propane fuel lines from Fuel Rail Pressure Control Module (FRPCM) to the rear of the engine.

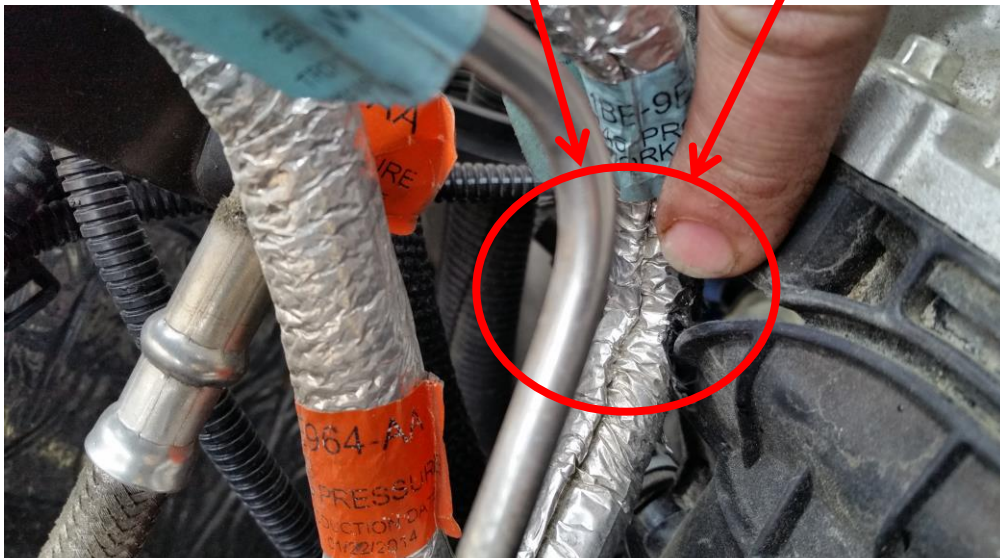
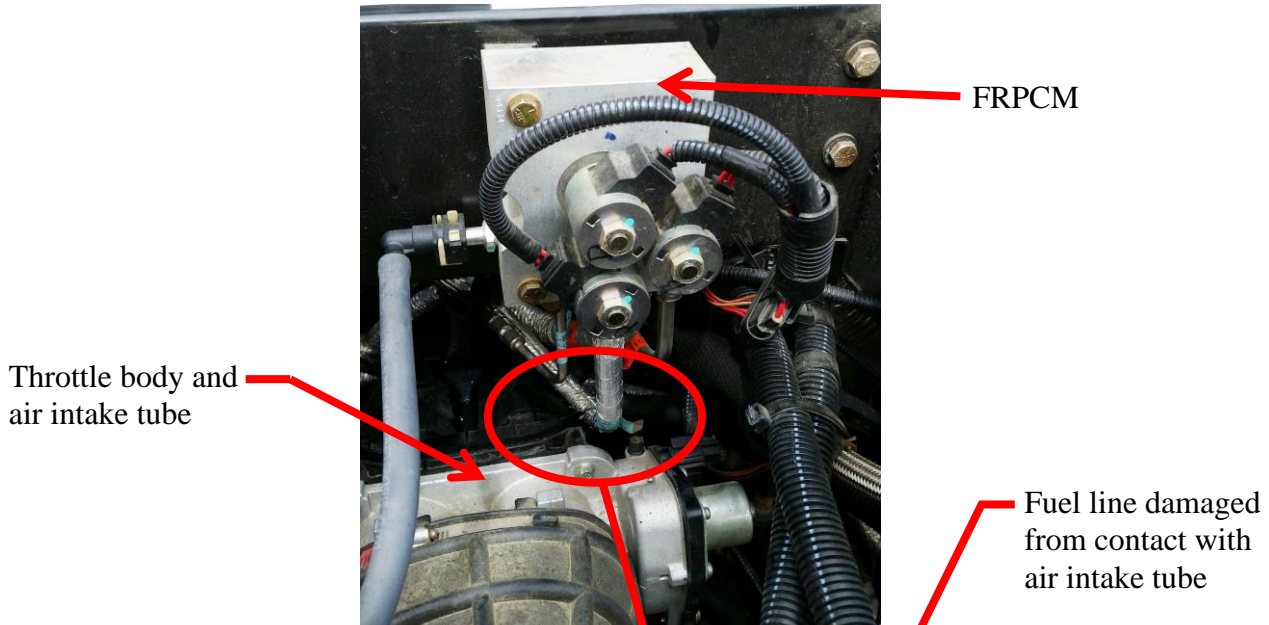


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INSPECT FUEL LINE ROUTING BELOW FRPCM



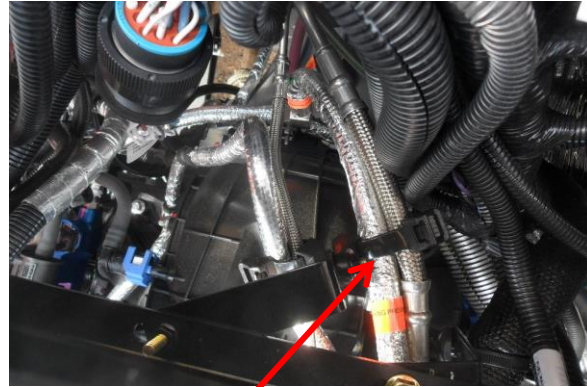
4. Inspect for clearance between the fuel lines and the air intake tube.
5. If the fuel lines are contacting the air intake tube, inspect for damage to the fuel lines and follow reroute instructions.

NOTE: If any lines need replacing, obtain replacement parts before rerouting lines.

6. See Page 6 for help in identifying a good or damaged fuel line. If any fuel lines are damaged, follow replacement instructions.

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INSPECT FOR CROSSED AND RUBBING FUEL LINES



Cable tie and heavy duty cable mounts

These are examples of fuel lines routing where the fuel lines may be crossed and/or rubbing. These lines must be rerouted, per instructions on Page 4. Remove existing cable ties from both heavy duty cable mounts.

Note:

Do not remove heavy duty cable mounts just the cable ties.

- Fuel lines may have been installed where they contact each other. If the lines are rubbing or crossed, then the fuel lines may become damaged. Remove the cable ties from both heavy duty cable mounts and inspect the fuel lines for any damage. If the fuel line has been damaged, follow fuel line replacement instructions.

NOTE: If any lines need replacing, obtain replacement parts before rerouting lines.



REROUTE PROCEDURE

WARNING: Always follow all Federal, State, Local, and Shop safety standards and use proper safety equipment, and thoroughly read and understand all instructions before performing these procedures.

CAUTION: Allow engine and components to cool prior to performing these procedures to prevent risk of severe burns.

WARNING: Technicians working with, or around, fuel systems should be properly trained to utilize extreme care and caution at all times. Failure to exercise extreme caution and care may lead to serious accidents which can result in property damage, personal injury and/or death.

WARNING: LPG is under pressure, wear adequate eye protection. When LPG is discharged into the atmosphere the rapid change in pressure can cause a refrigerant condition in the fuel (quick cooling) and can harm your skin or cause serious burns much like frostbite. Always wear gloves.

WARNING: Liquid propane is cold. The temperature of propane in its liquid state is -44° F (-42° C). Wear eye and ear protection during venting and repair operations. Keep moisture away from the valves. Failure to heed this warning can result in personal injury.

1. Park bus on level surface, apply parking brake, turn off ignition, remove key, and chock wheels.
2. Disconnect batteries.
3. Open hood and locate propane fuel lines from FRPCM to the rear of the engine.
4. **NOTE 1:** Cable ties on both sides of the bracket were cut and removed during the inspection process.

NOTE 2: If any line needs replacing, obtain replacement parts before rerouting lines.

NOTE 3: If the heavy duty cable mounts are missing during the inspection, please contact Blue Bird Recall Administration at campaignparts@blue-bird.com for parts. Parts shown below will be needed before lines can be rerouted because these support the dual clamp ties.

- 00024168 Mount, Heavy Duty CABLE, .25 hole size (2 required)
- 01247709 Washer, Flat, 17/64 ID X 5/8 (1 required)
- 01667773 Capscrew, Hex HD, ¼ - 20 X 1 , Gr 5 (1 required)
- 01339639 Nut, Hex HD, ¼-20, PRVLG Torque, Flange (1 required)



REROUTE PROCEDURE

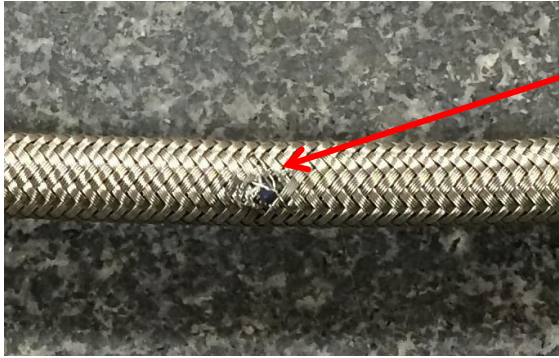
5. Using Photo's 1, 2, 3, and 4 in the **Proper Routing and Clamping Section** as your guide, reroute the four fuel lines to be parallel with each other. Install two or three dual clamp ties Part Number 00024043 to maintain separation.
 - a. **NOTE:** It may be necessary to loosen the fuel lines on the bottom of the FRPCM to reroute these fuel lines. Please follow **Roush CLEANTECH Depressurization Procedure** at the end of the document for depressurization procedure (purging) a system prior to loosening fuel lines. If lines need to be disconnected from the FRPCM for rerouting, replace Jiffy Tite Fittings. Roush's description and part numbers for the 1/4 inch fitting is 25031 (2 per FRPCM, as well as, 4 in the fuel lines) and for the 3/8 inch fitting part is 85672 (2 per FRPCM). Please contact **ROUSH CLEANTECH** at Phone Number: **800.59.ROUSH** or e-mail ROUSHcleantech.com with any questions regarding Roush's procedures.
 - b. **Be sure to follow ALL of the Warnings and Cautions in the propane section of Blue Bird Service Manual.**
6. Maintain 1/2 inch minimum clearance between the throttle body/air intake tube and the bottom of the fuel lines (See Photo 1).
7. If any fuel line has been damaged, replace fuel line(s) by following **Roush CLEANTECH Instructions** at the end of this document. See Page 6 on how to identify a good or damaged fuel line. Please contact **ROUSH CLEANTECH** at Phone Number: **800.59.ROUSH** or e-mail ROUSHcleantech.com with any questions regarding Roush's procedures.
8. After all fuel lines have been rerouted, repaired and/or replaced, check for leaks, check all the surrounding components to be sure nothing has been displaced with this rework. Place the bus back into service.



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HOW TO IDENTIFY A GOOD OR DAMAGED FUEL LINE/HOSE



Steel braid has been damaged, fuel line **MUST** be replaced.



Witness mark only, Do Not Replace.



Visible fiberglass damage shown on Roush Fuel Line. If the heat sleeve is worn through to the point that the fiberglass is visible like shown, then it is recommended that it be replaced. As long as the line underneath shows no damage to the braid then a replacement sleeve can be installed over the line. Please contact **ROUSH CLEANTECH** at Phone Number: **800.59.ROUSH** or e-mail ROUSHcleantech.com with any questions regarding Roush's procedures.

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Propane Fuel Line Routing

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PROPER ROUTING AND CLAMPING

RECALL CAMPAIGN R I G H T

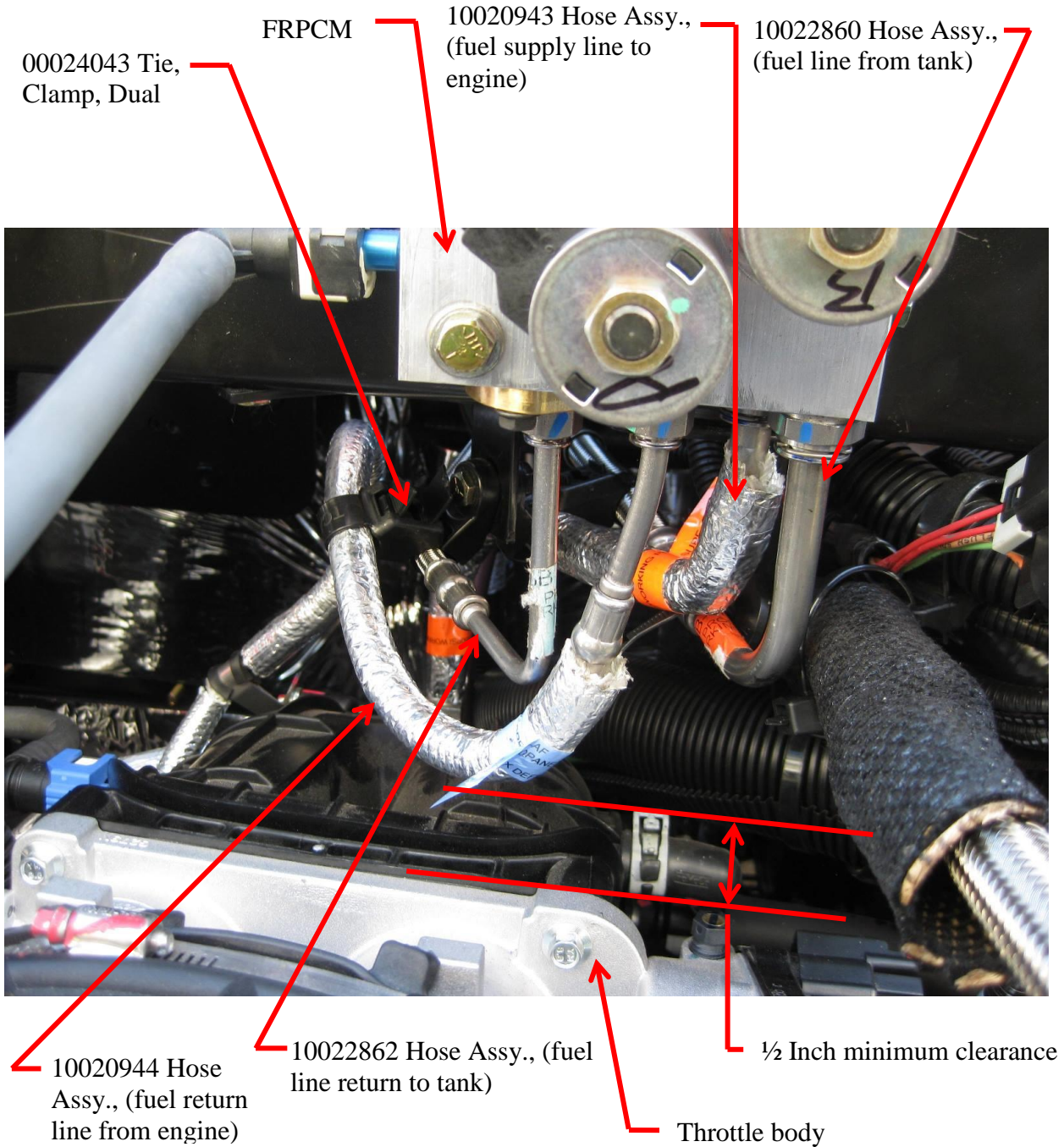


Photo 1
(Viewed from front of engine)



Propane Fuel Line Routing

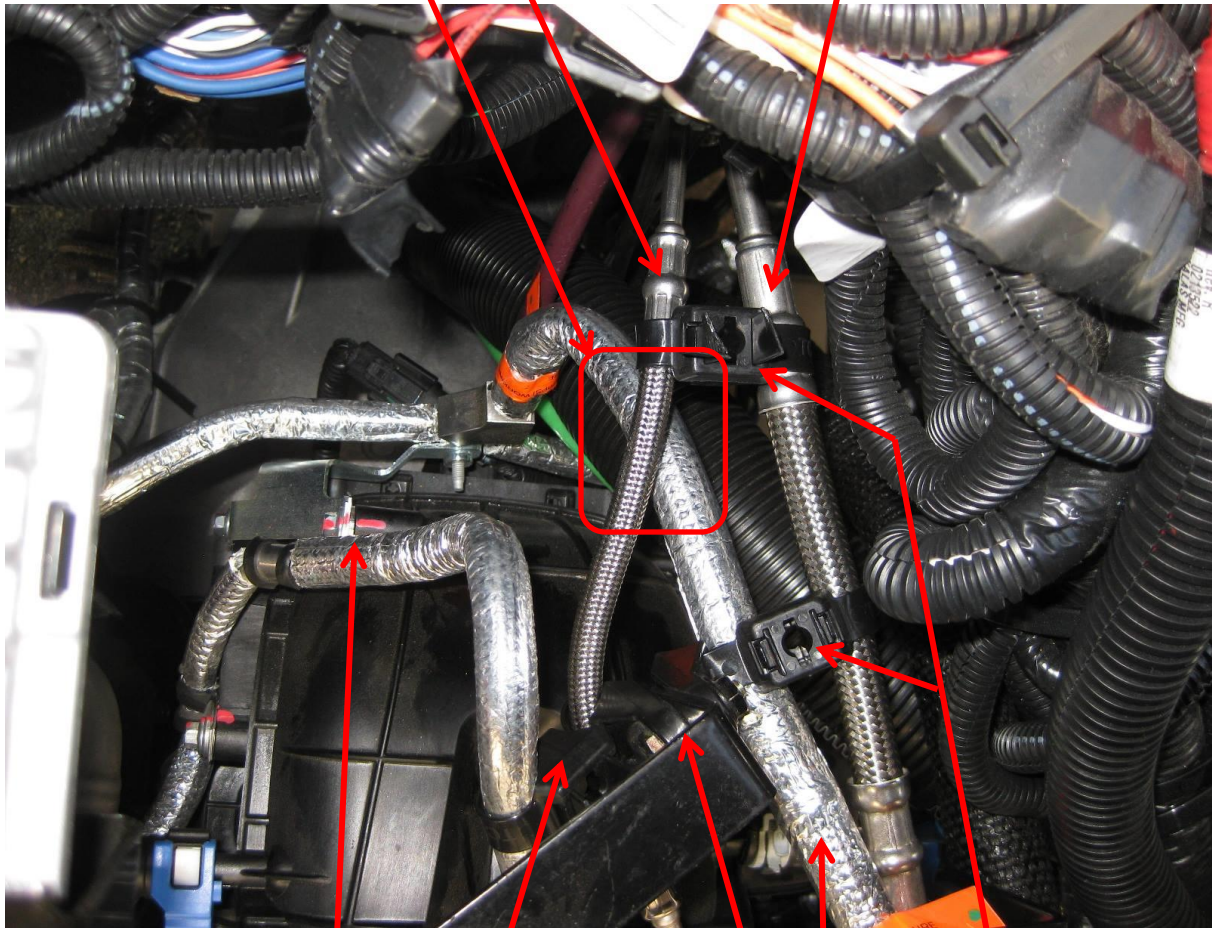
RECALL

PROPER ROUTING AND CLAMPING

Note: Ensure there is a minimum of 1/2 inch clearance between hoses.

10022862 Hose Assy.,
(fuel line return to tank)

10022860 Hose Assy.,
(fuel line from tank)



10020944 Hose Assy.,
(fuel return line from engine)

Existing support
bracket and two
heavy duty cable
mounts

00024043 Tie,
Clamp, Dual

00024043 Tie, Clamp, Dual

10020943 Hose Assy., (fuel
supply line to engine)

Photo 2
(Viewed looking down on top of engine with air brakes)

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Propane Fuel Line Routing

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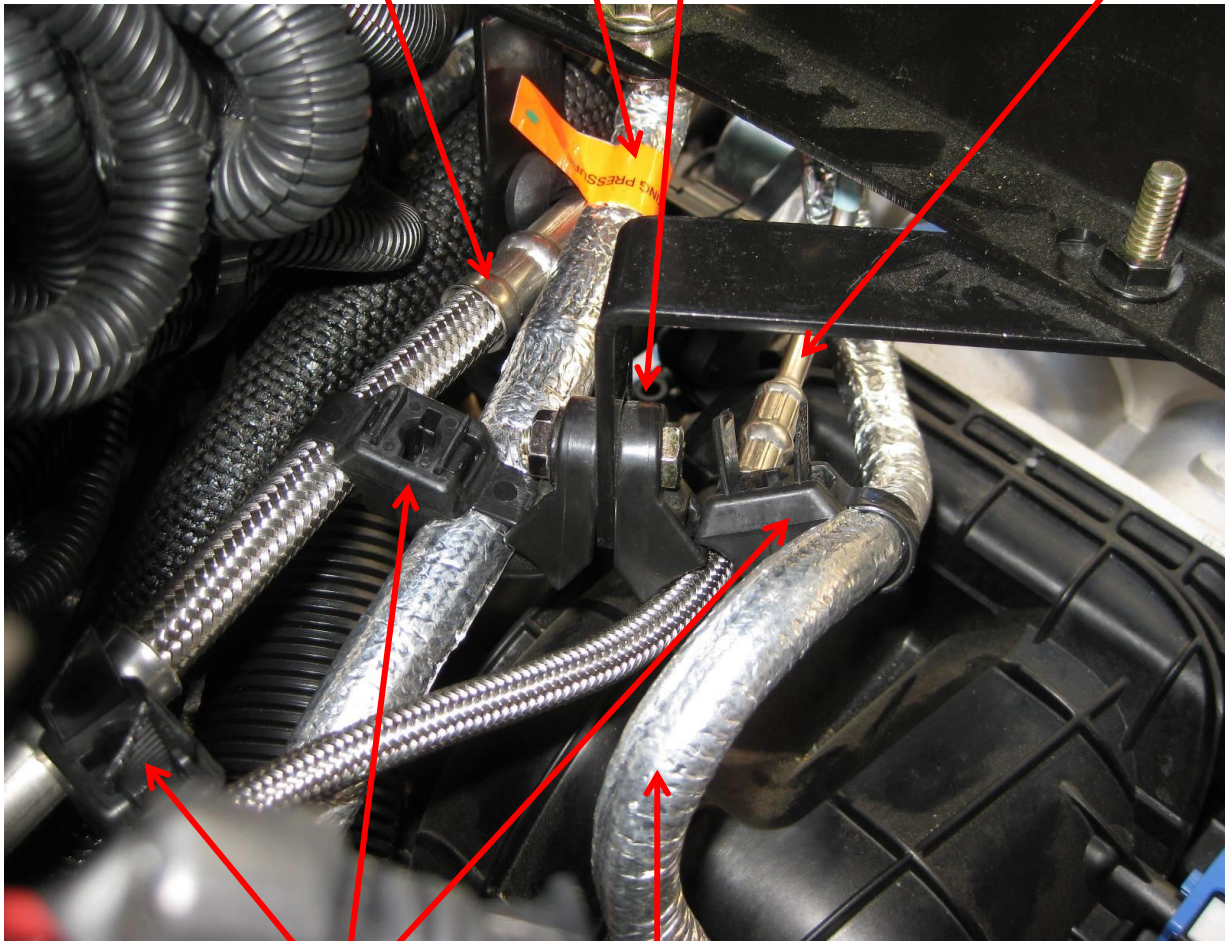
PROPER ROUTING AND CLAMPING

10020943 Hose Assy., (fuel supply line to engine)

Existing support bracket and two heavy duty cable mounts

10022860 Hose Assy., (fuel line from tank)

10022862 Hose Assy., (fuel line return to tank)



00024043 Tie, Clamp, Dual

10020944 Hose Assy., (fuel return line from engine)

Photo 3
(Viewed from rear of engine looking forward with air brakes)

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Propane Fuel Line Routing

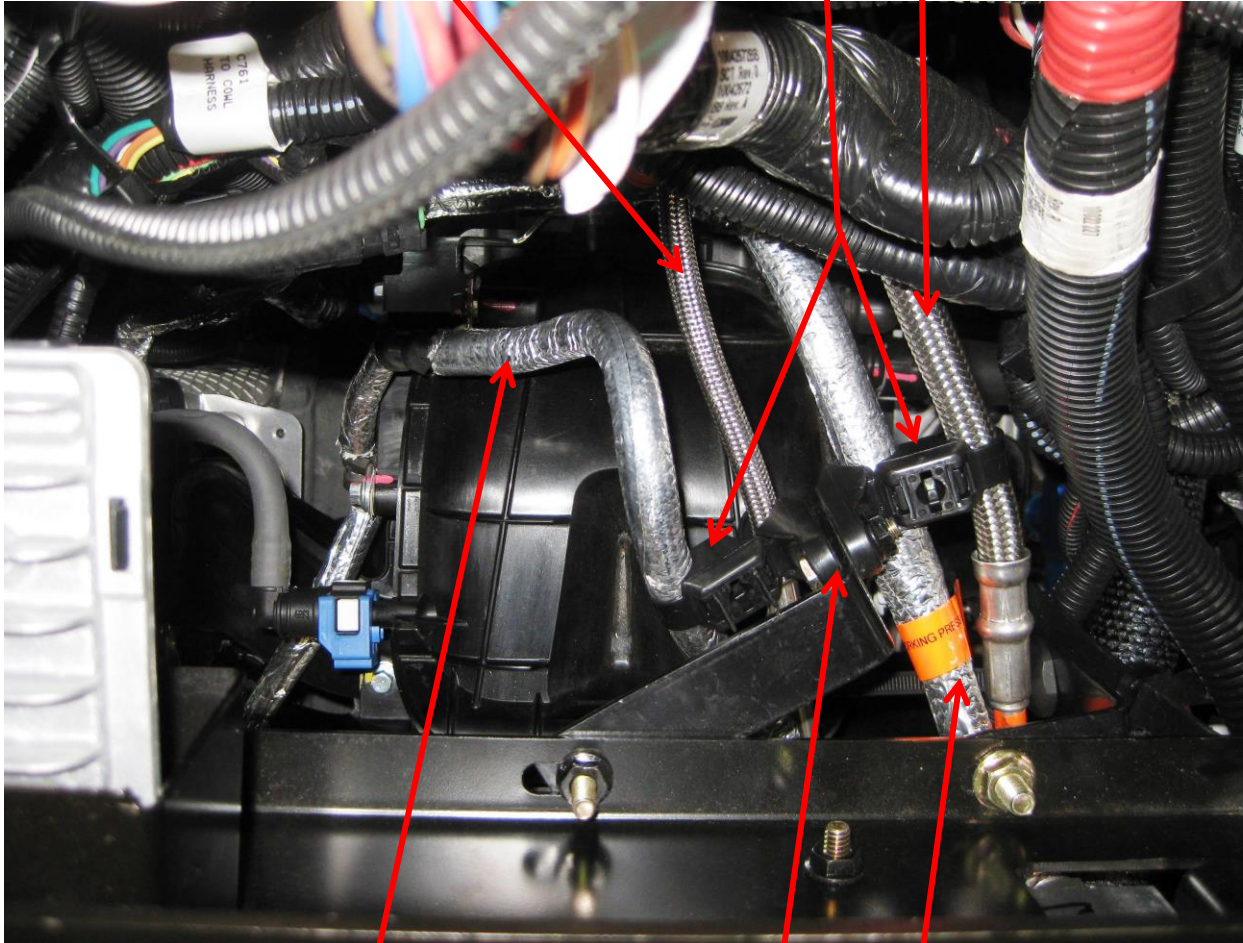
RECALL

PROPER ROUTING AND CLAMPING

10022862 Hose Assy.,
(fuel line return to tank)

00024043 Tie, Clamp, Dual

10022860 Hose Assy.,
(fuel line from tank)



10020944 Hose Assy.,
(fuel return line from
engine)

Existing support bracket
and two heavy duty
cable mounts

10020943 Hose Assy.,
(fuel supply line to
engine)

Photo 4
(Viewed looking down on top of engine with hydraulic brakes)

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Propane Fuel Line Routing

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PART NUMBER	DESCRIPTION	QUANTITY
00024043	TIE, CLAMP, DUAL	3
10020943	HOSE ASSY, SUPPLY, FUEL RAIL,ROUSH PROPANE	As Required
10020944	HOSE ASSY, SUPPLY, FUEL RAIL,ROUSH PROPANE	As Required
10022860	HOSE ASSY, PROPANE, FRWD FUEL LINE , FEED, ROUSH ,CV	As Required
10022862	HOSE ASSY, PROPANE, FRWD FUEL LINE , FEED, ROUSH ,CV	As Required
00024168	MOUNT, HEAVY DUTY, .25 HOLE SIZE	As Required
01247709	WASHER, FLAT, 17/64 ID X 5/8	As Required
01667773	CAPSCREW, HEX HD, 1/4 - 20 X 1 , Gr 5	As Required
01339639	NUT, HEX HD, 1/4-20, PRVLG TORQUE, FLANGE	As Required

Depressurizing Fuel System For Repairs

1. Disable 12V power to the fuel pumps by removing the fuel pump fuse from the fuse panel on the vehicle.
2. Fully close the manual shut-off on the tank supply valve.
3. Start the vehicle and let it run until it stalls, this will remove the majority of the liquid from the fuel lines. (Delay period during this start will be extended due to fuel pumps not running and rail pressure not building)
4. Perform the starting procedure a second time to ensure liquid is removed from lines.
5. Locate the fuel line union on the return line near the fuel tank and slowly crack it loose to relieve the lines of the remaining vapor pressure.
6. Turn the ignition to crank and allow the vehicle to attempt to flush the system but do not allow the vehicle to crank (Be sure to turn the ignition off before the vehicle reaches 30 seconds of delay time). This will allow the pressure from the supply side of the system to drain through the return line union. This may have to be done several times until pressure is no longer coming from the return line union.
7. Perform the necessary fuel system repairs.

Fuel Rail Return Line – Replacement

NOTE: Clearing the propane out of the fuel lines (purging) is required before working on any fuel system component. Please follow the fuel system de-pressurization procedure outlined in the ROUSH CleanTech service manual.

WARNING: Liquid propane is cold. The temperature of propane in its liquid state at atmospheric pressure is – 44°F (–42°C). Wear eye and ear protection during venting and repair operations. Keep moisture away from the valves. Failure to heed this warning can result in personal injury.

Remove - Fuel Rail Return Line

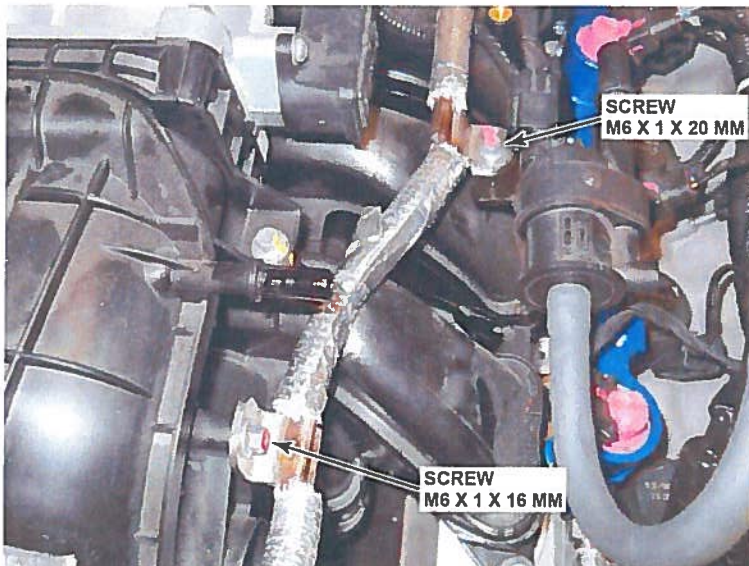
1. Close the manual shut-off valve on the tank supply valve..
2. Disconnect the FRPCM wire harness connector at the FRPCM.
3. Connect the supplied bleed harness to the FRPCM.
4. Connect selected bleed harness leads to the battery positive (+) and known good vehicle ground.
5. Allow the FRPCM to bleed completely (minimum of five (5) minutes).
6. Disconnect the supplied bleed harness and leads.
7. Disconnect ground cable from vehicle battery and/or turn off battery switch.
8. Remove the air intake tube from the throttle body.
9. In order to verify that the fuel rail is fully depressurized, slowly loosen one of the Jiffy-Tite fittings in the fuel rail retighten Jiffy-Tite fitting to 20-22 Nm once propane is drained

WARNING: Liquid propane or vapor may vent from the Jiffy-tite fitting when loosened

10. Release the reusable zip tie from the fuel return line. Remove and discard reusable zip tie.
11. Disconnect the fuel return line from the FRPCM using the appropriate Jiffy-Tite tool.
12. Disconnect the fuel return line from the RH and LH fuel rails using the appropriate Jiffy-Tite tool.
13. Disconnect VMV hose from the Intake Manifold.

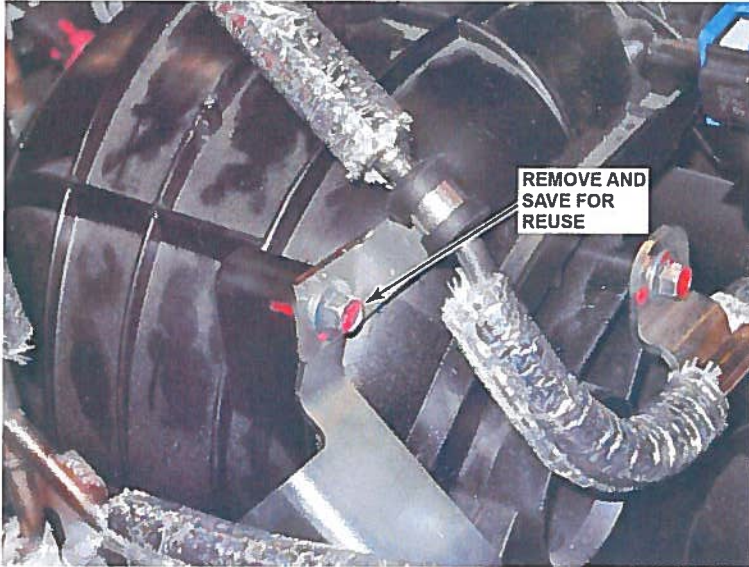
Welded Bracket Fuel Rail Return Line Only:

- a. Remove and discard (2) fuel return line bracket screws M6 x 1 x 20 and M6 x 1 x 16 as shown below.



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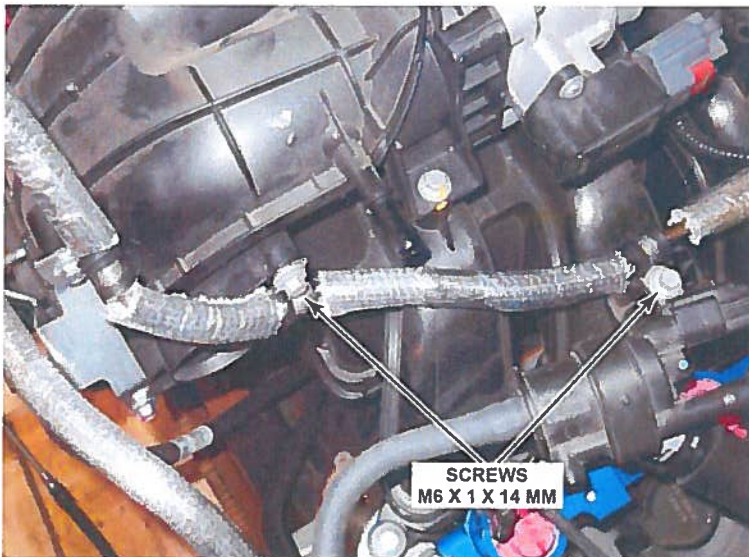
- b. Remove (1) M6 X 1 X 16 screw and save for reuse. Remove the fuel return line from the engine.



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P Clip Attached Fuel Rail Return Line Only:

14. Remove (2) M6 x 1 x 14 screws and (1) M6 x 1 x 16. Save mounting screws for reuse. Remove the fuel return line from the engine.

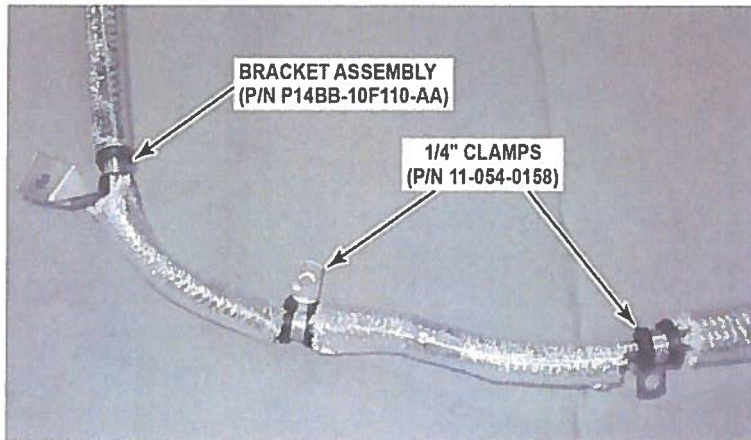


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Install – Fuel Rail Return Line

CAUTION: Fuel return line bracket screws must be installed in positions indicated or damage to intake manifold will occur.

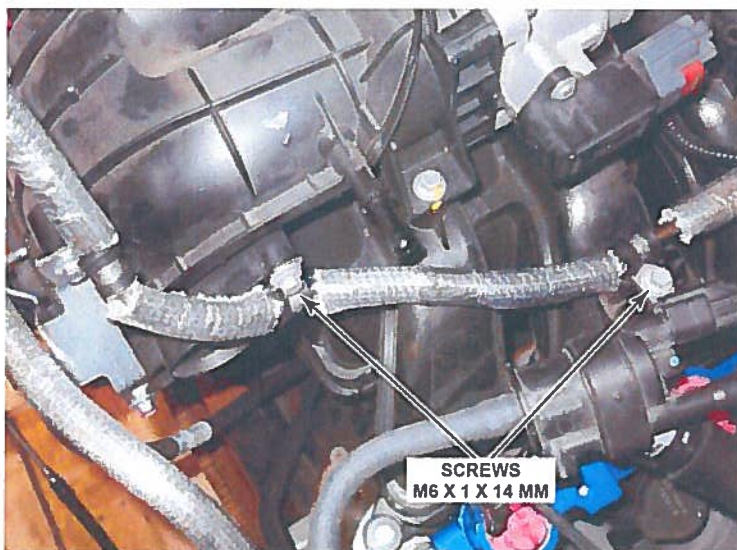
15. By hand, slightly spread open the fuel return line bracket assembly (P/N P14BB-10F110-AA) and 1/4" clamps (P/N 11-054-0158). While supporting the fuel return line, install the bracket assembly over the fuel return line. Make sure the rubber portion of the bracket assembly is seated around the fuel return line and is not rolled or pinched. Position the fuel return line bracket assembly against the crimp on the fuel return line.



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16. Position the replacement fuel return line onto the engine and connect the fuel return line to both the RH and LH fuel rails.

17. Loosely install two (2) M6 X 1 X 14 mm fuel return line bracket screws.



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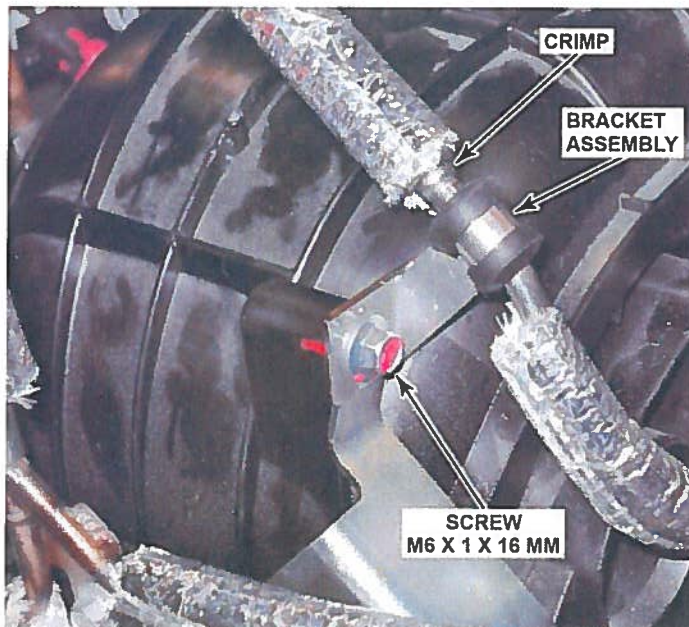
18. Compress the fuel return line bracket assembly around the fuel return line. Align the fuel return line bracket assembly to the fuel supply line support bracket. Ensure that the bracket assembly does not have to be forced into position.



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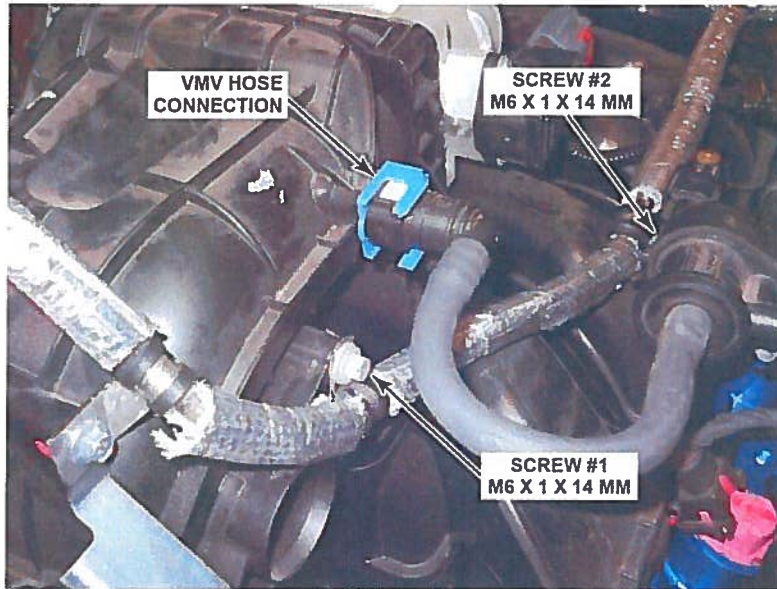
NOTE: Do NOT bend the fuel return line.

Install the bracket assembly with the previously removed M6 X 1 X 16 mm screw. While tightening, make sure to apply pressure to the back of the bracket assembly to keep it from contacting the intake manifold. Torque to 8-12 Nm and mark the head of the screw after applying specified torque.



100347b

19. Tighten and torque the remaining fuel return line mounting bracket screws in sequence. Torque screw labeled #1 first followed by screw labeled #2. Torque to 8-12 Nm and mark the head of the screw after applying specified torque.
20. Reconnect the VMV hose to the intake manifold and position lock tab. Verify connection by gently pulling on VMV hose.



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23. Replace Jiffy-Tite on FRPCM fuel rail return line fitting
24. Connect fuel rail return line to FRPCM
25. Reconnect the FRPCM to the engine harness.
26. Reconnect battery ground and/or turn on main power switch.
27. Open the manual shutoff valve on the tank and turn the key to the crank position. If the vehicle does not start after the first attempt, turn the key OFF and then turn the key to the crank position a second time. Repeat sequence until vehicle starts.