

# Z1 VHR FUEL RETURN KIT INSTALLATION MANUAL



This Installation Manual is intended for the following models:

2009-2020	Nissan 370Z
2008-2015	Infiniti G37/Q60 Coupe
2009-2015	Infiniti G37/Q40 Sedan

## PROLOGUE:

Study these instructions completely before proceeding to assembly. The installer must have a thorough knowledge of automotive systems operation. If unfamiliar with any of the concepts outlined in this instruction, we recommend the installation be completed by a qualified professional.

## WARNING!

Extreme caution should be taken when performing maintenance or performance upgrades to your vehicle. Please observe and abide by any Warning or Caution labels placed on the various components and tools used when servicing your vehicle. If you have any questions regarding installation or the various components included with the Z1 Motorsports 370Z Fuel Return Kit, consult with a Professional Mechanic or contact Z1 Motorsports for more information.

## **PARTS INCLUDED:**

Item	Quantity	Description
1	1	VHR Fuel Rail Set
2	1	Assembled Top Hat Kit
3	2	Z1 Top Hat Rods
4	6	M5 x 6mm Socket Head Bolts – Top Hat to Gas Tank
5	1	Red Loctite 0.5ml
6	1	Fuel Pump Bulk Head Connector and Terminal Set
7	24"	Submersible Fuel Hose
8	4	Screw Clamp
9	1	Fuel Pressure Regulator Delete - Main Body
10	1	Fuel Pressure Regulator Delete - Retainer
11	2	M3 x 20mm Screw - Regular Delete
12	1	Z1 Fuel Pressure Regulator
13	1	Fuel Pressure Regulator Bracket
14	2	M6 Nylon Lock Nut – Regulator Bracket to Firewall
15	1	Z1 In-Line External Fuel Filter
16	1	Fuel Filter Mounting Clamp
17	1	Fuel Filter Mounting Bracket
18	2	M5 x 12mm Screw - Fuel Filter Bracket to Clamp
19	1	M5 x 16mm Screw - Fuel Filter Clamp
20	1	Z1 Fuel Return Line Kit - 7 Lines
21	2	AN Y-Adapter
22	1	5/16" Quick Disconnect Threaded Adapter 6AN Male
23	1	3/8" Quick Disconnect Threaded adapter 6AN Male
24	1	Foam Sleeve Insulation
25	1	6AN ORB Slim Plug w/ O-Ring
26	1	6AN ORB fittings w/ O-Ring
27	1	0-100psi 1/8" NPT Mini Fuel Pressure Gauge
28	1	90* 1/8" NPT Female to NPT Male
29	1	VACUUM TUBE - 5.0 MM - BLACK - 1 Inch
30	1	3/8 – 1/4 Reduction Tee Fitting
31	2	Small Spring Clamp
32	2	Large Spring Clamp
33	2	Bonded Sealing Washer
34	1	Cushion Loop P-Clamp
35	1	Selected Fuel Pump (with relay kit depending on pump size)
36	6	Selected Fuel Injectors
37	2	OPTIONAL: OE Fuel Pulse Damper O-Ring
38	2	OPTIONAL: OE Fuel Pulse Damper

## **TOOLS REQUIRED:**

- Hydraulic Jack
- (2) 2-Ton (or greater) Jack Stands
- Ratchet
- Ratchet Extension(s)
- Assorted Metric Sockets
- Assorted Metric Wrenches
- 2.5mm Allen/Hex Key
- 4mm Allen/Hex Key
- Flat Head Screwdriver
- Torque Wrench
- Channel Lock Pliers
- File
- Snips
- Dremel or Body Saw
- Wire Strippers
- Wire Crimp Tool

## **SAFETY REQUIREMENTS:**

- Always wear safety glasses and any necessary protective garments. If using any fluids, chemicals, or solvents, a respirator is recommended.
- Always turn the ignition to the OFF position and disconnect the NEGATIVE battery terminal.
- Always use properly rated jack stands when working under your vehicle.
- Always keep limbs and parts away from moving drivetrain parts.
- Only operate drivetrain in safe space and well-ventilated areas.
- **NO FIRES, SPARKS, OR SMOKING.**
- **WORK IN A WELL-VENTILATED AREA.**

## **BEFORE YOU BEGIN:**

Remove contents from the Z1 Motorsports 370Z Fuel Return Kit and verify that ALL necessary hardware is present.

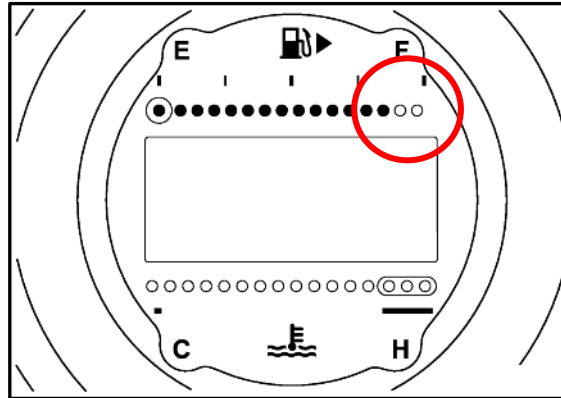
The full Z1 370Z Fuel Return Kit is made up of several different Z1 Motorsports products. The procedures below will be broken up into various sections specific to each product. Depending on the configuration of products you chose for your fuel system, it may require jumping around to different sections of this guide. Many of the components and modifications required will depend on what options you choose, pay attention to the bold and underlined notes regarding specific steps. It is highly recommended to read through this entire manual to get an idea of the installation process.

All provided fittings are AN, ORB, or include sealing washers. DO NOT add your own thread sealant or PTFE sealant tape unless instructed. Aluminum fittings like AN lines and the ones included in this kit do not need to be torqued very high like many steel bolts. Over torquing AN fittings will create a leak.

## PROCEDURE:

### **Fuel Pump Upgrade and Top Hat Kit:**

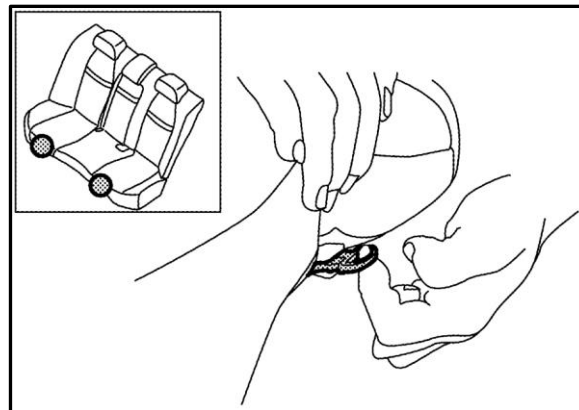
1. Place the transmission in Park position (or in Reverse gear if equipped with a manual transmission). Apply the parking brake.
2. Locate proper jacking points on vehicle's chassis (refer to vehicle's Owner Manual). Raise and support vehicle using jack & jack stands.
3. It is recommended to install this kit with the gas tank NOT full. Nissan recommends at least 2 dots on the gas gauge to be unlit, see *Figure 1* below.



*Figure 1*

4. **G37 Coupe Owners:** Lift up on the rear seat cushion to remove it. Then remove the floor carpet. Then remove the metal cover by rotating the clips 90 degrees clockwise

**G37 Sedan Owners:** There will be hook levers to pull to release it. Pull on the levers and at the same time pull upwards on the front of the seat cushion (shown in *Figure 2*) to unseat the clips.



*Figure 2*

**370Z Owners:**

- a. Remove the carpeted shelf floor behind the passenger seat (*Figure 3*).



*Figure 3*

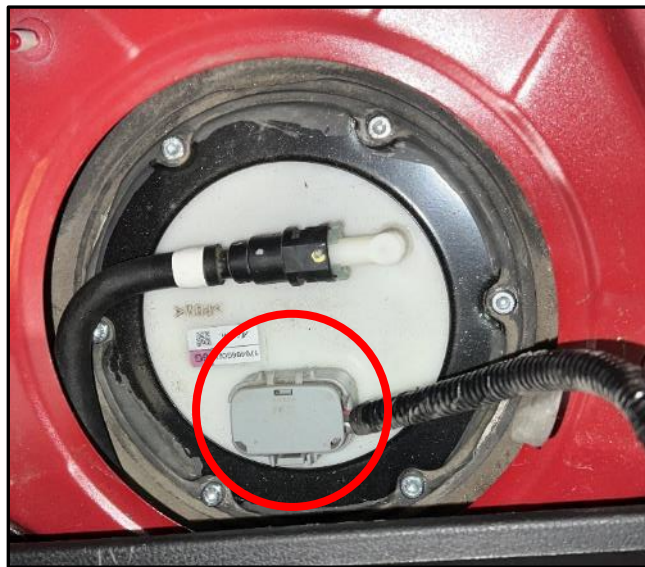
- b. Remove the nuts securing the inspection cover to the chassis (shown below in *Figure 4*). Then remove the cover and set aside. The wiring harness will remain attached through the grommet, just rotate the cover out of the way.



*Figure 4*



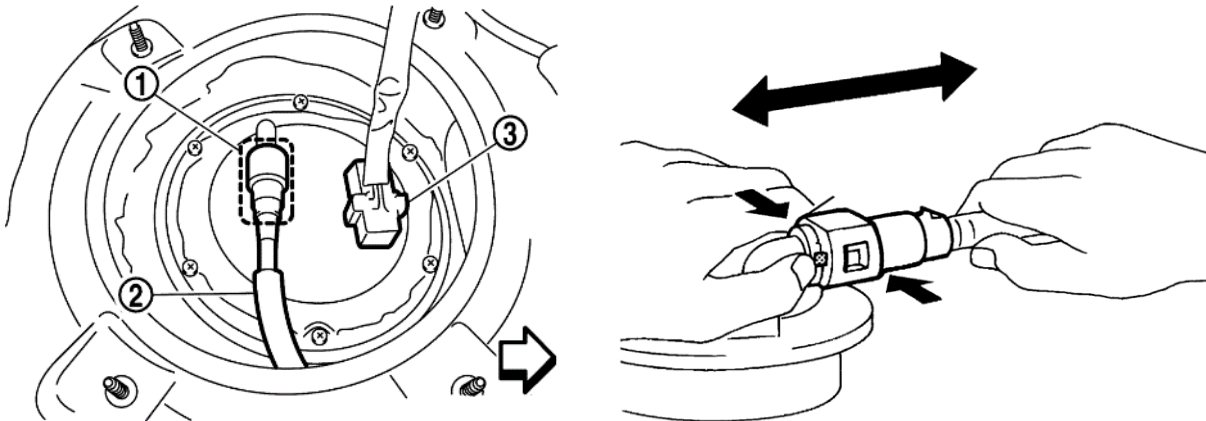
5. It is now time to release the fuel system pressure. There are a couple ways to do this:
  - I. If you have access to CONSULT:
    - a. Turn ignition switch ON.
    - b. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT.
    - c. Start engine.
    - d. Wait for the engine to run out of fuel and stall.
    - e. Crank engine over two or three times to release remaining fuel pressure.
    - f. Turn the ignition switch OFF.
  - II. If you do not have access to CONSULT:
    - a. Disconnect the electrical connector on the top of the fuel tank (shown below in *Figure 5*).
    - b. Start engine.
    - c. Wait for the engine to run out of fuel and stall.
    - d. Crank engine over two or three times to release remaining fuel pressure.
    - e. Turn the ignition switch OFF.



*Figure 5*

6. Remove the gas filler cap to release any pressure left in the tank.
7. Assure the ignition is in the OFF position and disconnect the NEGATIVE battery terminal.
8. It is recommended to clean the top of the OE fuel top hat and surrounding areas of the tank to prevent dirt or contaminants from falling in when you remove it.

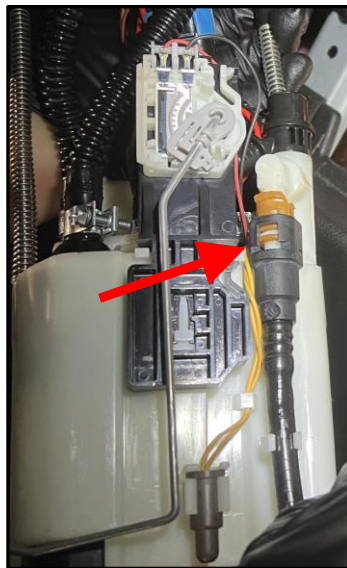
9. Place a rag around the OE fuel supply hose ② on the OE fuel top hat, and then disconnect the hose by pressing the sides of the retaining clip ① in and pulling the hose away. If the clip comes off with the hose that is fine, it can be put back on later. *Figure 6.*



*Figure 6*

10. Using an 8mm socket, remove the (6) six M5 bolts securing the OE fuel top hat to the fuel tank.
11. Carefully lift upwards to begin removing the fuel pump basket assembly. There is an internal siphon hose connected to the basket that needs to be removed. Once the basket is about halfway out, disconnect the siphon hose similar to how the fuel supply hose was disconnected in *Step 9 (Figure 7.)*

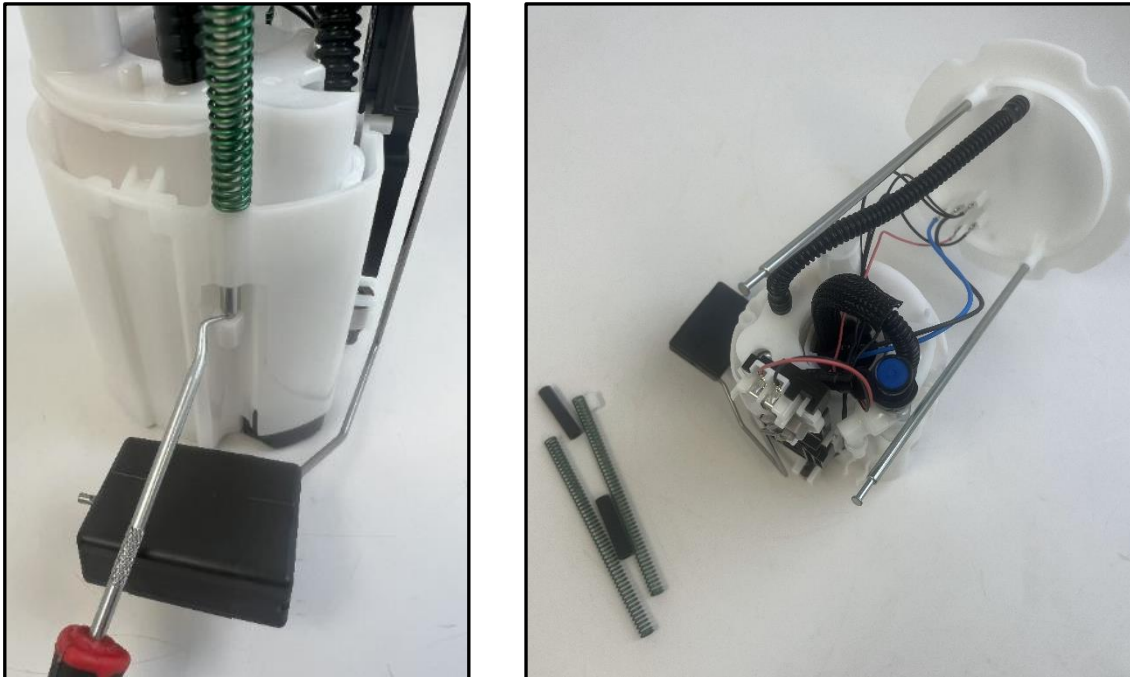
**NOTE:** The Figure below shows a modified 370Z basket assembly that is fully removed from the car to better show the siphon hose. It is recommended to disconnect the siphon hose prior to fully removing the basket assembly.



*Figure 7*

12. Once the siphon hose is disconnected, fully remove the fuel pump basket assembly. Be careful not to bend or damage the floater on its way out.
13. Depending on how much fuel was in your tank, the basket assembly will likely be full of fuel, drain any fuel into an appropriate container.
14. Move to a clean work table to begin disassembly of the OE fuel basket.

15. Compress the top hat/springs and using a pick or flathead screwdriver, remove the locking retainer on one of the top hat rods (shown below in *Figure 8*).
16. Once the locking collar is removed, separate the top hat from the lower basket assembly. *Figure 8*.



*Figure 8*



17. There are 2 different styles of the 370Z top hat and they have different style connectors on both the top and underside of the top hat, early model years up to 2015 (production date before 02/2015) and late model years 2015+ (produced after 02/2015). *Figure 9* below is the early style, *Figure 10* is the late style.

Take a picture or note where all the connectors on the underside of the top hat go, AND their position in the connector. For example, in *Figure 9*, the thick blue wire goes to the positive side of the fuel pump and is in the top left corner of the connector on the underside, and far left on the top side. The colors and orientation changed over the years. It would be best to use tape or a label of some kind to denote what each wire connects to, but a picture or note at a minimum will work.

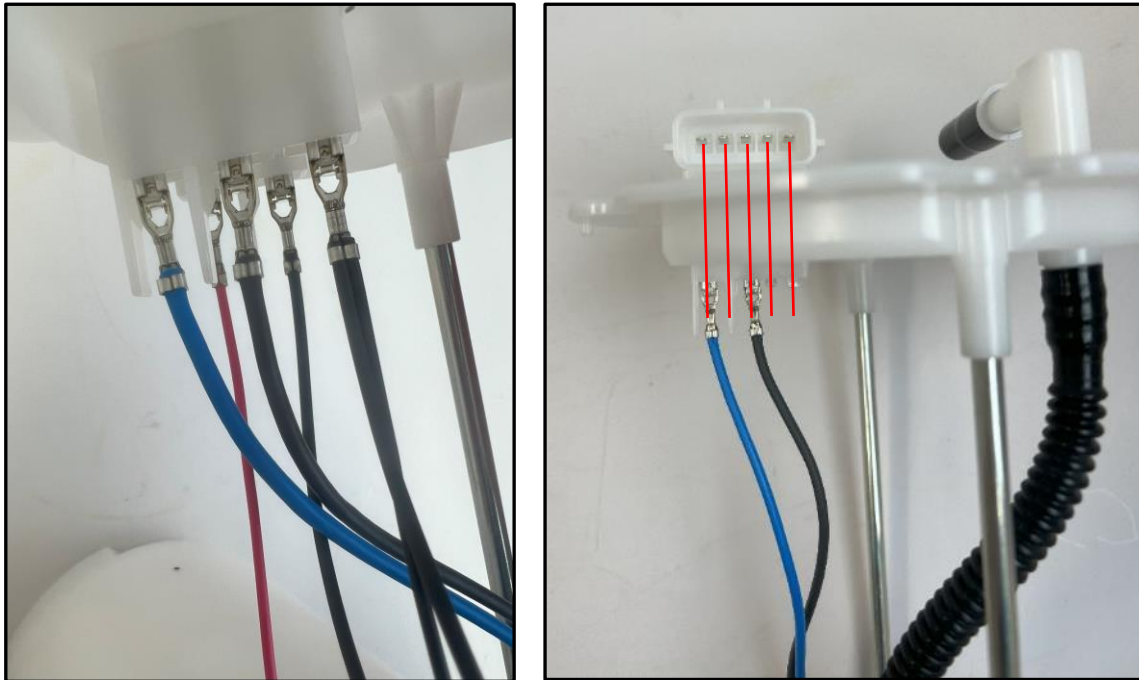


Figure 9

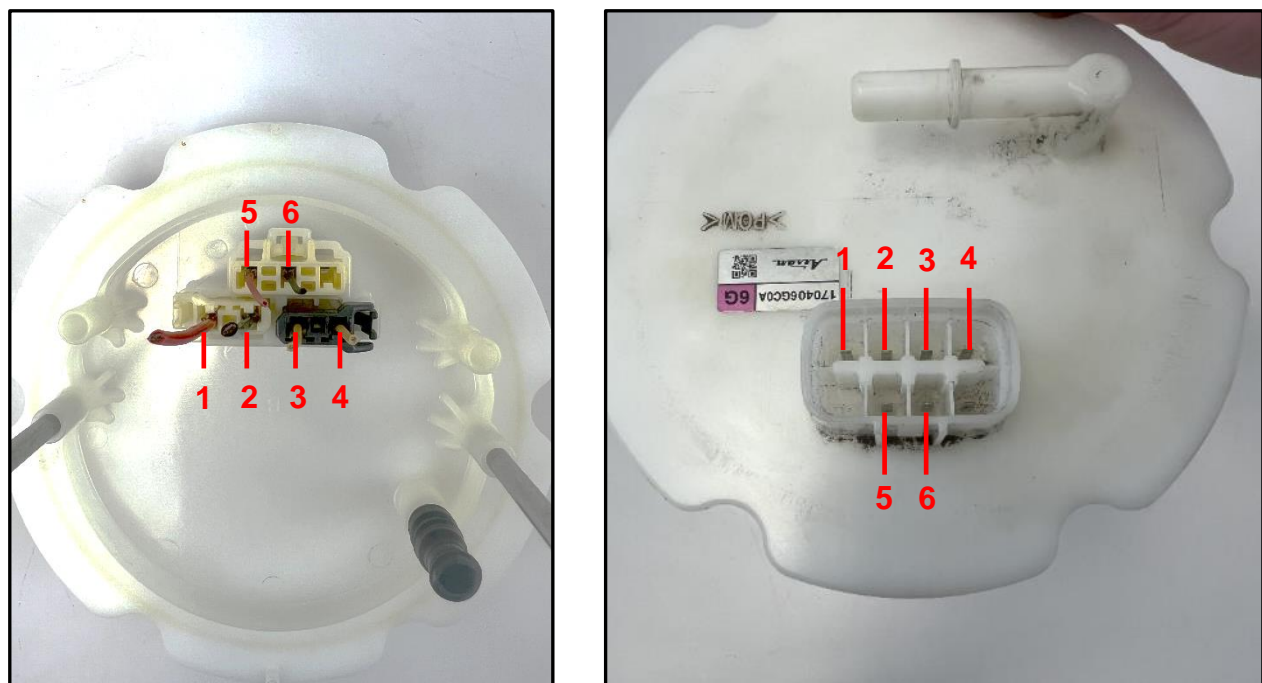
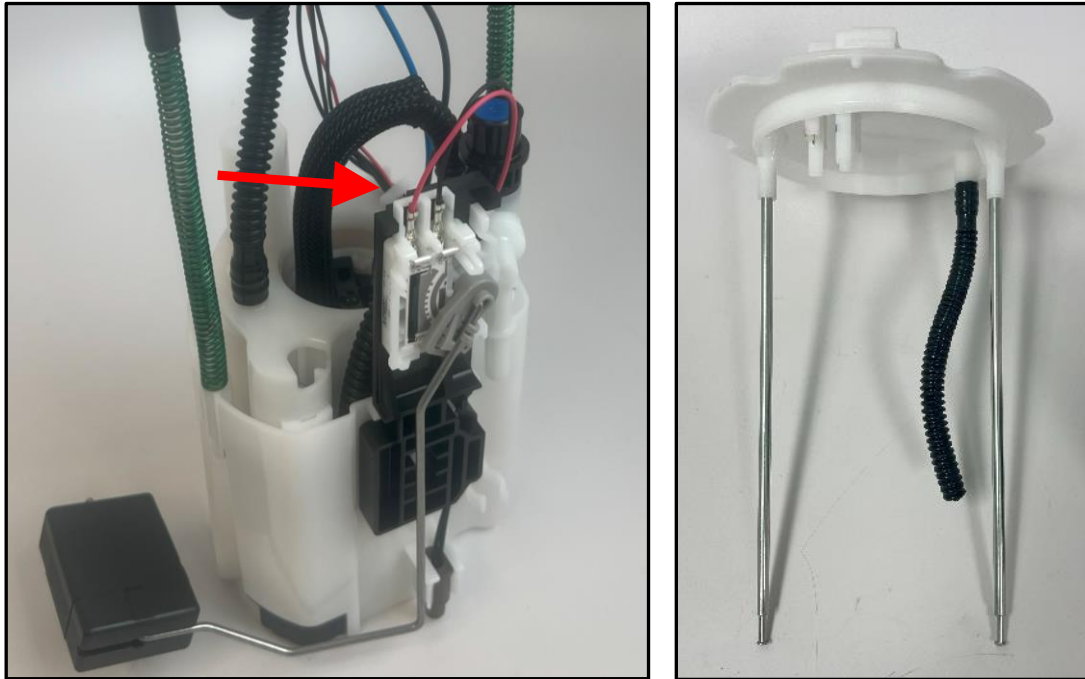


Figure 10

**Steps 18-20 are only for customers who purchased a Z1 Top Hat Kit. If you just purchased an upgraded fuel pump or the return system without a top hat, skip to Step 21.**

18. Once you have taken a picture/note/labeled the wires and are confident in where each one goes to, cut all (6) six wires on the underside of the top hat as close to the connectors/terminals as possible.
19. Remove the wires for the fuel level sensor and fuel temperature sensor from the clip on the top of the fuel pump housing (shown with arrow below in *Figure 11*).
20. Cut the black corrugated fuel tube connecting the top hat to the lower inner fuel pump housing (fuel filter), the OEM top hat should now be fully disconnected from the lower basket assembly. *Figure 11*.

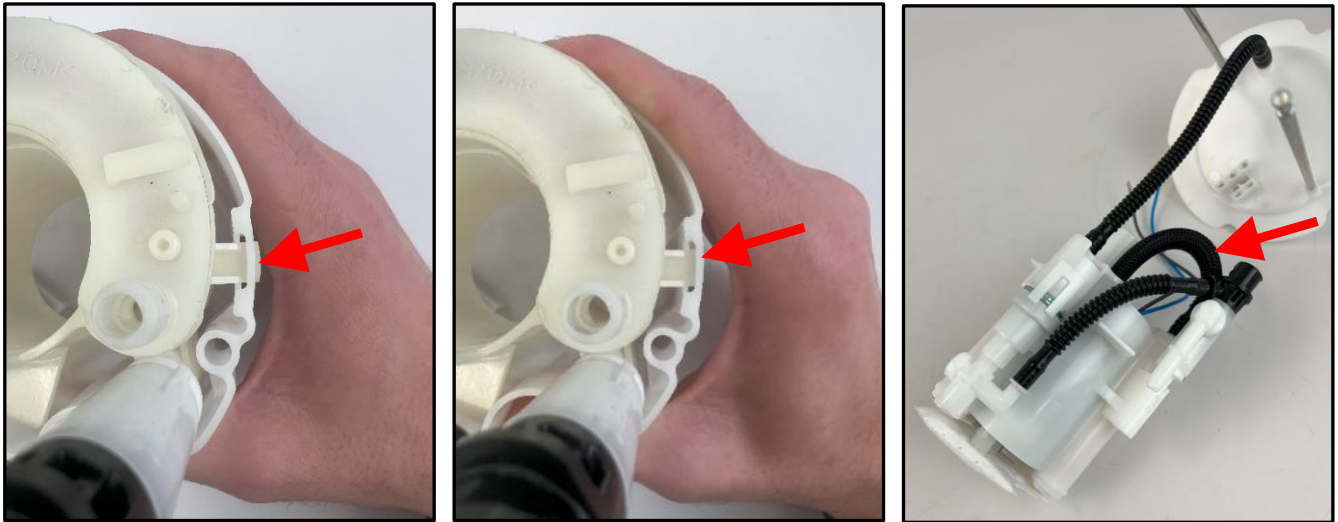


*Figure 11*

**Steps 21-23 are only for customers who purchased a return system AND upgraded fuel pump but without a Z1 Top Hat.**

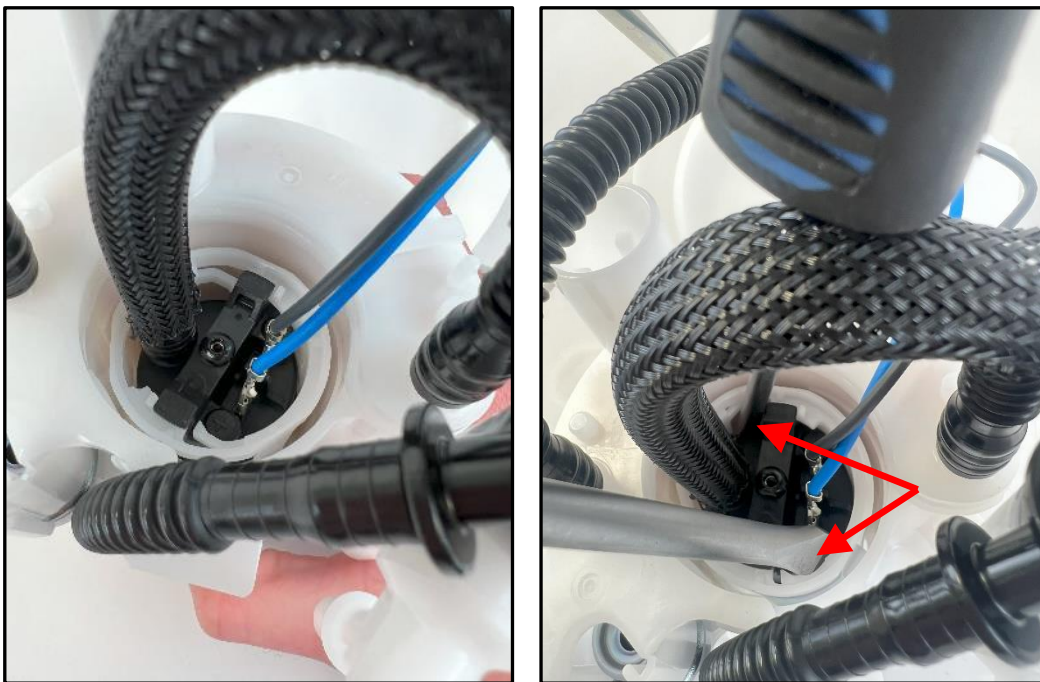
21. Disconnect or cut the (2) two wires on the OE fuel pump as close to the connector/terminals at the fuel pump end.
22. Disconnect but DO NOT cut the fuel level sensor and temp sensor wires from the OE top hat.
23. Remove the fuel level sensor and fuel temp sensor from the lower basket.
24. Remove the fuel pump housing from the lower basket that contains the fuel pump by squeezing/wiggling the lower basket to unclip it. Once unclipped, firmly pull up to remove the fuel pump housing.

25. Cut both the black corrugated fuel tube connecting the OE fuel pump to the OE fuel filter (shown with arrow in *Figure 12 below* at right) and fuel tube connecting the OE top hat to the OE fuel filter. Then fully remove the corrugated tubes from the top of the fuel filter and bottom of the top hat by cutting down the side of the remaining tube with a razor.



*Figure 12*

26. Using (2) two screwdrivers or picks, unclip the fuel pump and rotate it counterclockwise to remove it from the housing. *Figure 13.*



*Figure 13*

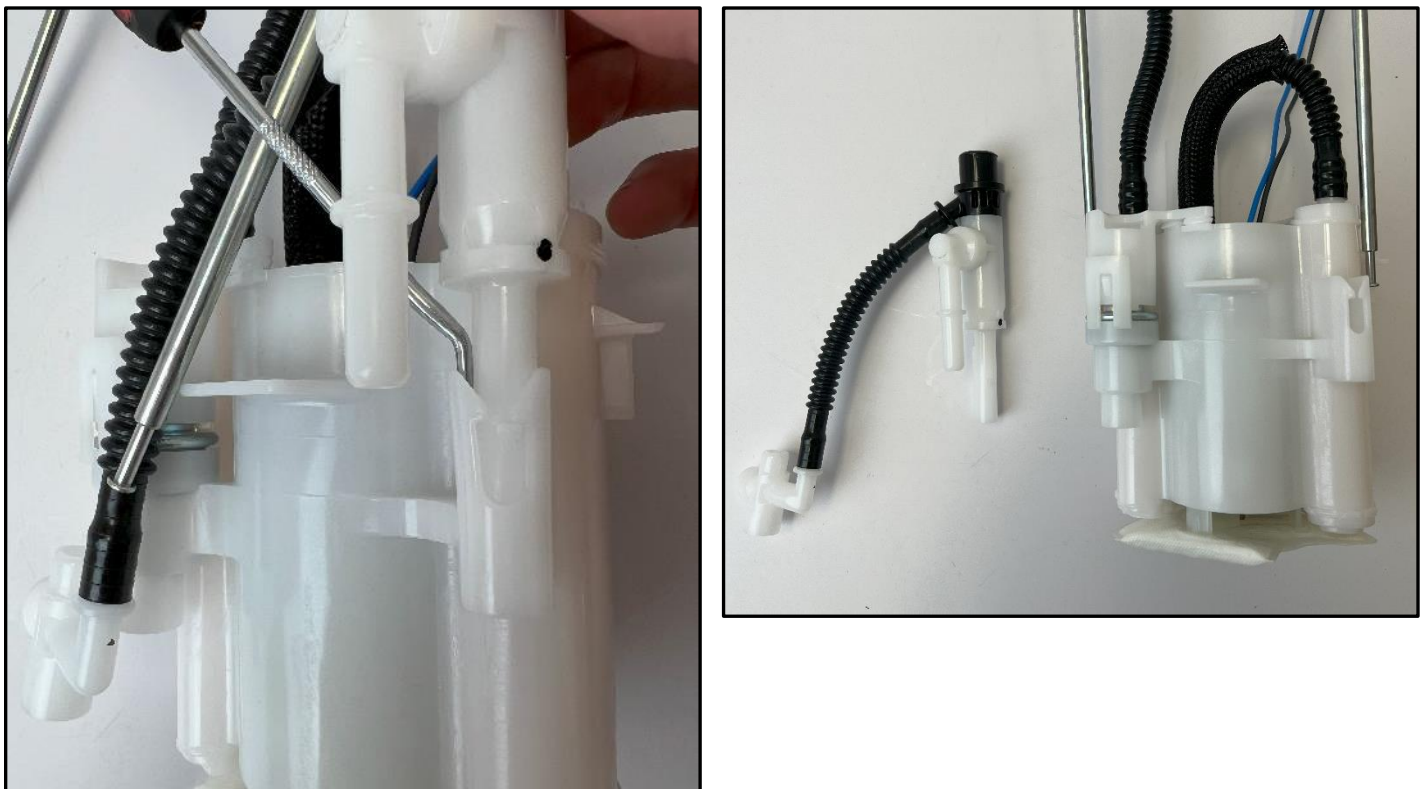
27. You should now be left with just the fuel pump housing/fuel filter and a few components of the venturi system. *Figure 14.*



*Figure 14*

28. Pull down on the corrugated black hose connecting to the bottom of the OE fuel pressure regulator.

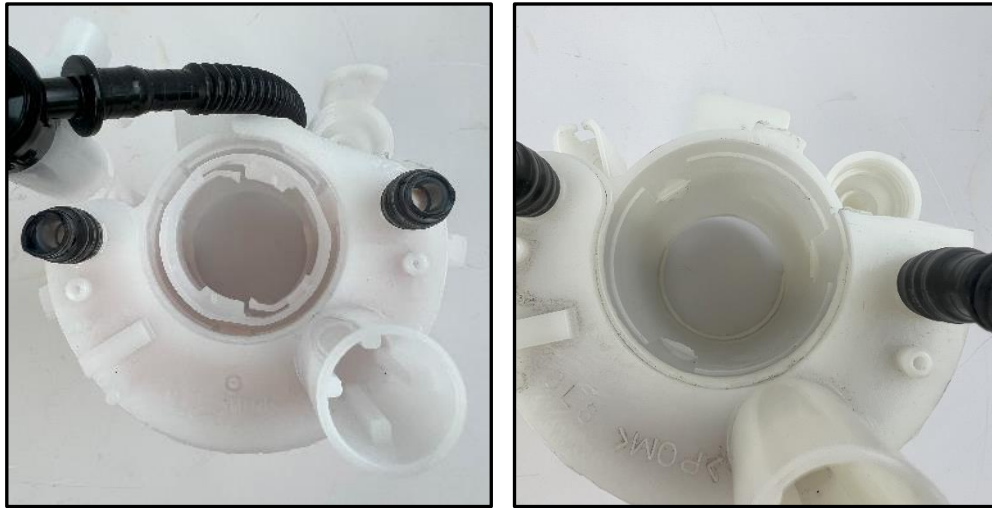
29. Using a pick, separate the plastic clip and pull up to remove the valve and hose. *Figure 15.*



*Figure 15*



30. **For all upgraded fuel pumps:** Using snips/Dremel/body saw, cut the retaining clip out of the interior of the fuel pump housing. Using a file or Dremel, smooth out the bore to remove any burrs until it is relatively smooth. *Figure 16.*



*Figure 16*

31. **For 485/525 fuel pumps:** Due to the increased diameter of the bottom of the fuel pump, you will need to cut off much more of the fuel pump housing and clean/scrape out the interior OE fuel filter. The housing will need to be cut off up to roughly where the outlet of the OE fuel pressure regulator housing is. Below are some pictures showing an example, with the red line showing where the OE fuel pressure regulator housing ends. *Figure 17.*



*Figure 17*

32. At the bottom of the lower basket there is a small black plastic piece that is part of the venturi refill system. This piece directs the output of the fuel that is bled off by the fuel pressure regulator. When you upgrade your fuel pump and increase the amount of fuel the regulator has to relieve at low idle situations, this venturi component can become a restriction causing high fuel pressure at idle. To increase the amount this piece can flow, you must slightly drill out the orifice on the bottom. The orifice is roughly 0.050" when unmodified.

From the inside of the lower basket, push this venturi refill piece out. You do not need to remove it, pushing it from the inside will push it about halfway out, just enough to access the orifice on the side (as shown below, *Figure 18*).



*Figure 18*

33. This is not an exact science, as many components affect how well the venturi system will function. If your fuel pressure regulator is unable to maintain low enough fuel pressure at idle, this step will need to be repeated with a slightly larger drill bit. It is better to start small and have to redrill, then to drill too much.

Be careful when drilling as this component is not sold separately and if damaged, and will require the purchase of an entire new sending unit/fuel basket. Be careful to make sure the drill bit does not quickly thread into the orifice but is actually drilling. **DO NOT** drill through the backside of the piece.

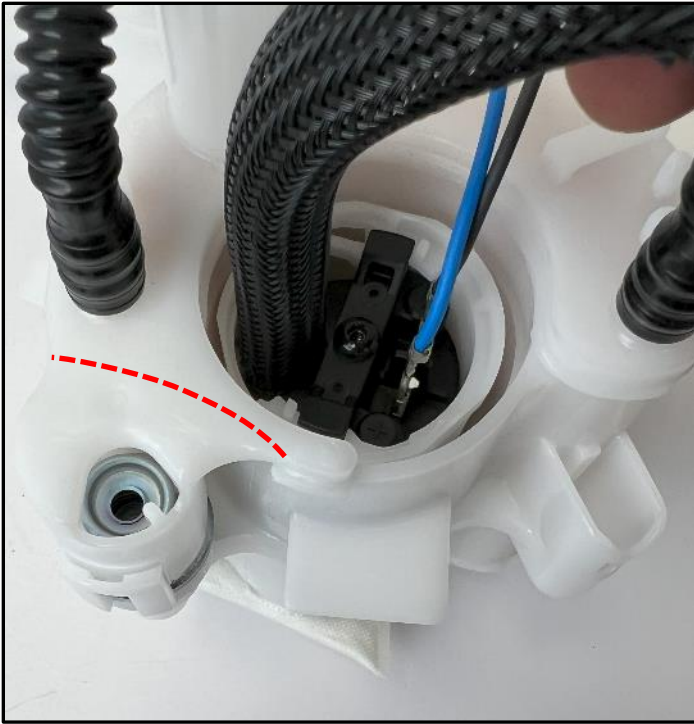
Depending on the size of the upgraded pump you are installing, drill out the orifice to the recommended size shown in table below.

Pump Size	Recommended Orifice Size	Recommended Drill Bit Size
255lph or 340lph	~0.075"	#49 drill bit = 0.0730", #48 drill bit = 0.076", 5/64 drill bit = 0.0781", 2mm drill bit = 0.0787"
525lph	~0.125"	1/8 drill bit = 0.125", 3.2mm drill bit = 0.126"

34. Once drilled, reinstall the venturi orifice piece into the lower fuel basket.



35. The OE fuel pressure regulator will need to be removed when using the Z1 regulator. Using a body saw or die grinder, trim the corner of the fuel pump housing where the OE fuel regulator is. *Figure 19.*



*Figure 19*

36. Once trimmed, remove the OE regulator (*Figure 19* above). Retain the O-rings as they will be reused.

37. Locate the Z1 Regulator Delete, and remove the Regulator Delete from the bag and separate the two pieces. Install the O-rings onto the Z1 Regulator Delete (*Figure 20* below).

38. Install the larger delete piece into the fuel pump housing where the OE regulator was removed from.

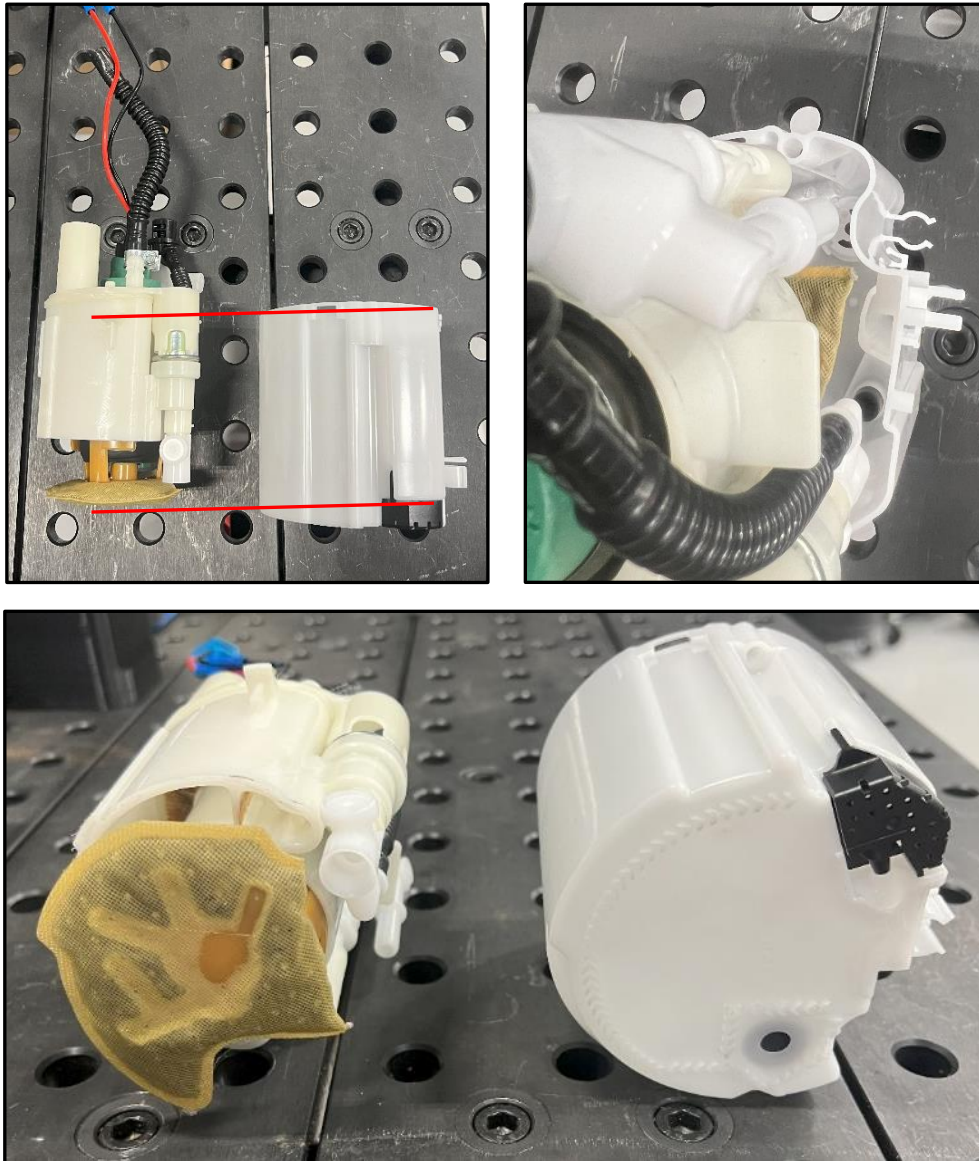
39. Place the retainer on the bottom of the housing and secure the pieces together with the provided M3 bolts (*Figure 20*).



*Figure 20*

40. Once the lower baskets have been modified for you fuel pump/regulator, locate your new fuel pump.
41. Transfer the OE fuel strainer from the OE pump onto the new pump.
42. With either the foam sleeve included with the fuel pump, or the other provided foam sleeve installed onto the new pump, install the fuel pump into the bore of the fuel pump housing. Use of silicone spray is recommended.

**NOTE: 525 LPH Fuel Pump:** The fuel pump and strainer will need to be at a certain height and clocking to allow the fuel pump housing to be reinstalled into the lower basket. Reference *Figure 21* below to adjust the height and clocking of your fuel pump and strainer.

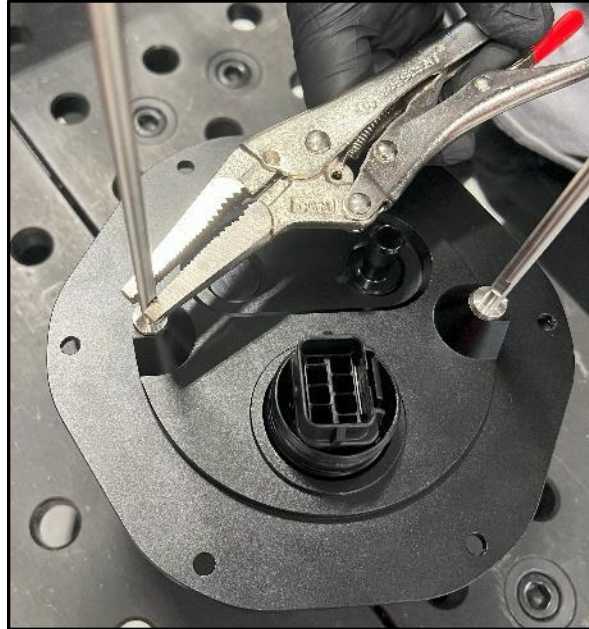


*Figure 21*

43. Install the fuel pump housing assembly with the new fuel pump into the lower basket making sure the locking tabs on the side are seated.
44. Reinstall the fuel level sensor, fuel temp sensor, and venturi components that were removed in earlier Steps onto the lower basket.

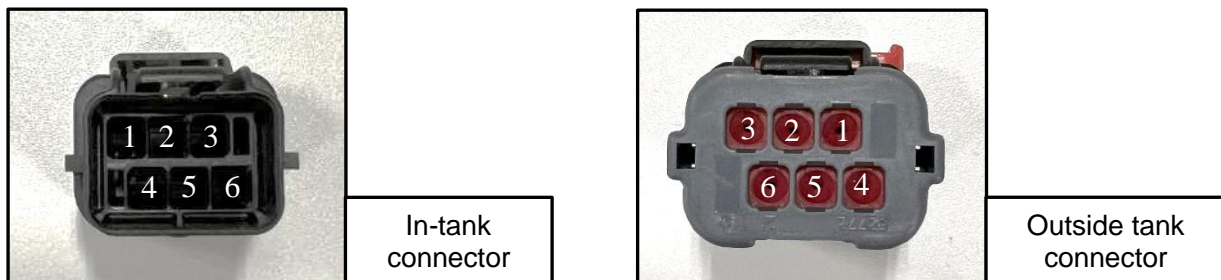
**Steps 45-62 are only for customers who purchased a Z1 Top Hat.**

45. Locate the Z1 Top Hat kit. The top hat will be partially pre-assembled.
46. Install the 3/8" (larger) quick disconnect threaded adapter fitting onto the pump side 90° barb fitting.
47. Using a 8mm hex key, install the loose 90° barb fitting into the return port of the top hat just like the preinstalled pump side.
48. Using a 4mm wrench or pliers on the flat spots and with a dab of the supplied Loctite, install the long threaded rods into mounting bosses on the underside of the top hat. *Figure 22.*



*Figure 22*

49. Using the provided wire terminals, crimp a terminal onto each wire that was cut in *Step 18* and onto the new fuel pump power and ground wires. You will not need the full length of the new fuel pump wires. Hold the top hat next to the basket roughly where it will sit and cut the new fuel pump wires at an appropriate length to reach the bulkhead connector.
50. There are two connectors supplied with the kit, one for inside the tank and one for outside. The outside connector will have red seals on the backside of the connector and a grey locking piece. The in-tank one may have the grey locking piece but WILL NOT have the seals. Both connectors should come with the blue locking tab, in the unlocked position. You can tell if it is unlocked if the blue piece is flush with the top of the connector housing. If it is not unlocked using a pick or small pliers, pull the tab into the unlocked position. *Figure 23.*



*Figure 23*



51. Install the crimped terminals through the backside of the in-tank connector, the backside is the one without the blue locking tab. It does not matter which pin in the connector the wires go through as long as the outside connector is wired the same way. The outside connector will have a flipped pinout as it shifts when going through the bulkhead. Make sure to take a note or picture of what wire is connected to what pinout in the diagram above so you can properly wire up the outside connector. This is where the note/picture taken in *Step 17* comes into play. Once all wires are installed, press the blue locking tab to lock them in place.
52. Install the OE fuel pump basket springs and collars that came off the OE rods, onto the Z1 rods with the collar first then springs. Then install the Z1 Rods with the Top Hat into the lower basket. Secure with the OE locking collar that was removed in *Step 16*.
53. Connect the new in-tank connector to the bulkhead on the bottom side of the Z1 Top Hat.
54. Locate the provided submersible fuel hose and (4) four small clamps.
55. Cut a ~14" section of hose that will connect from the fuel pump outlet to the bottom side pump barb on the Top Hat. The hose is long so it can make a loop between the pump outlet and Top Hat barb to prevent it from kinking. Secure with a clamp.
56. Cut another ~7" section of hose to connect the bottom side return barb on the Top Hat to the top barb of the regulator delete that was installed in *Step 38*. Secure with a clamp. See *Figure 24* for assembled Fuel Basket.

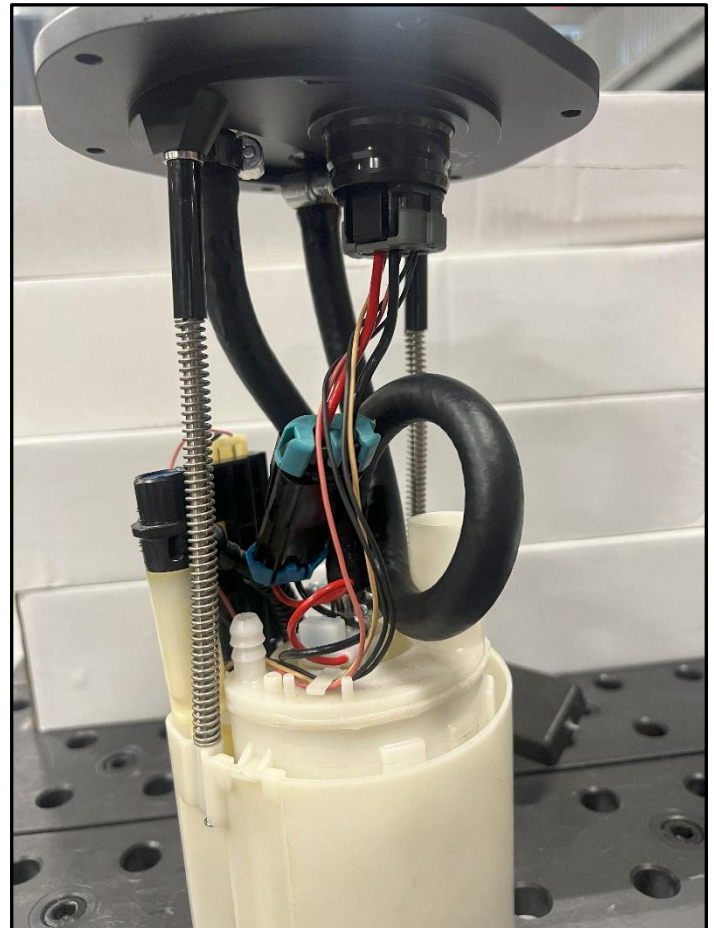


Figure 24

57. Take the assembled fuel basket over to the vehicle.
58. Cut the wires on the OE chassis side fuel pump connector that was removed from the OE fuel top hat in *Step 6* one at a time.

59. Crimp a terminal onto the OE wire. Then, install the terminal into the outside connector through the red seal according to the pinout in *Figure 23*. Refer back to your notes/pictures from *Step 17* and *Step 51* to ensure each wire is connected properly. *Figure 25*.

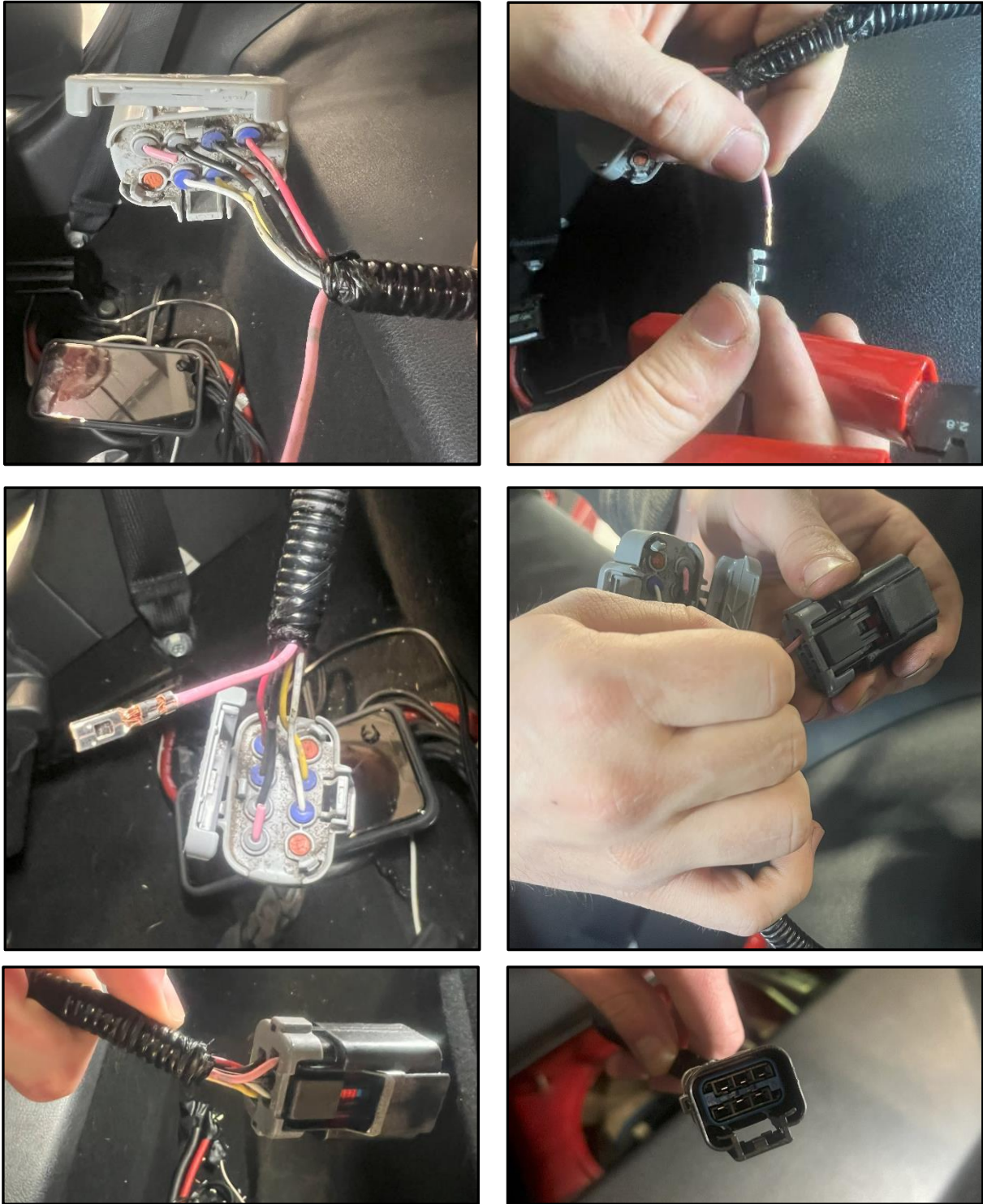


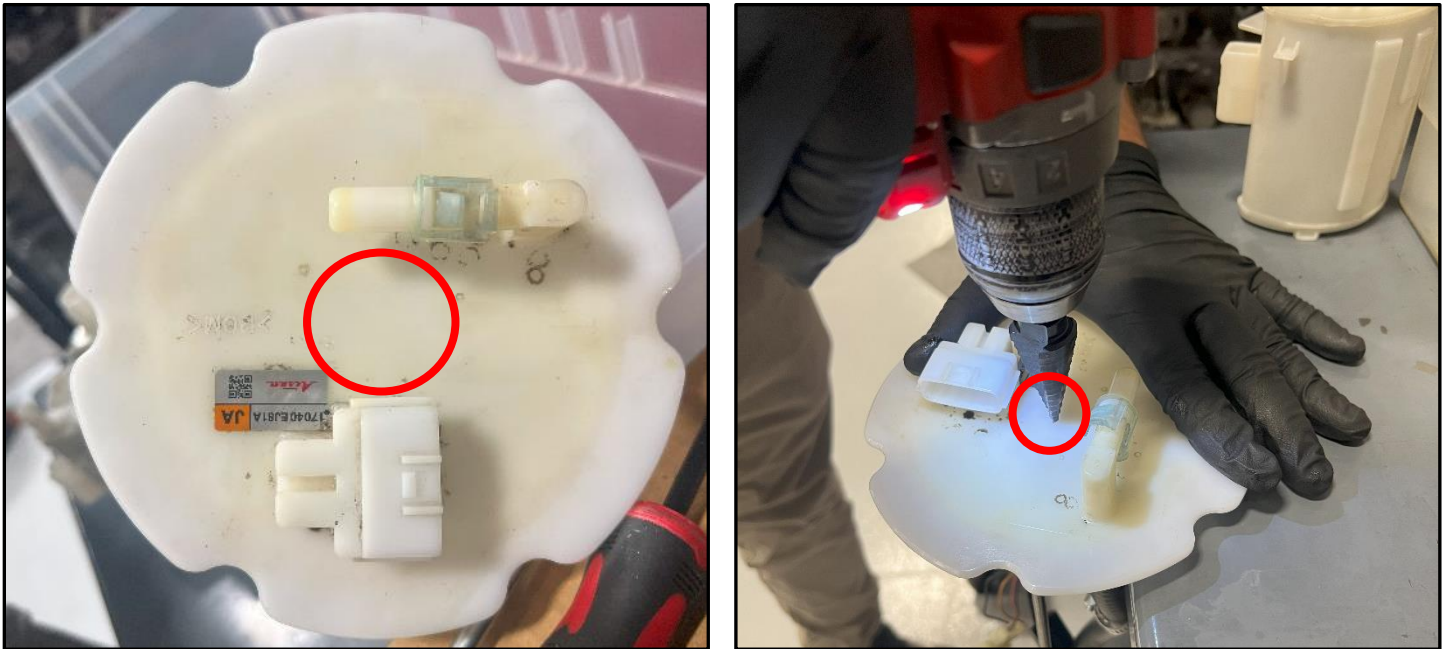
Figure 25

60. Once all wires are connected properly to match the connector on the bottom side of the top hat, carefully install the fuel basket assembly into the fuel tank. Be careful not to bend the fuel level sensor or pinch/cut the submersible fuel hose on the fuel tank opening. Make sure to also reconnect the siphon hose from inside the tank.
61. The fuel basket should rest on the bottom of the tank and will need to be compressed a small amount, roughly 5mm, to secure the top hat. Secure the top hat to the fuel tank with the (6) six provided M5 x 6mm Socket Head Bolts. Connect the new chassis side harness connector to the Z1 Top Hat.
62. For 525 pumps you will need to install the included fuel pump relay kit. Refer to the instructions provided with that relay kit for installation.



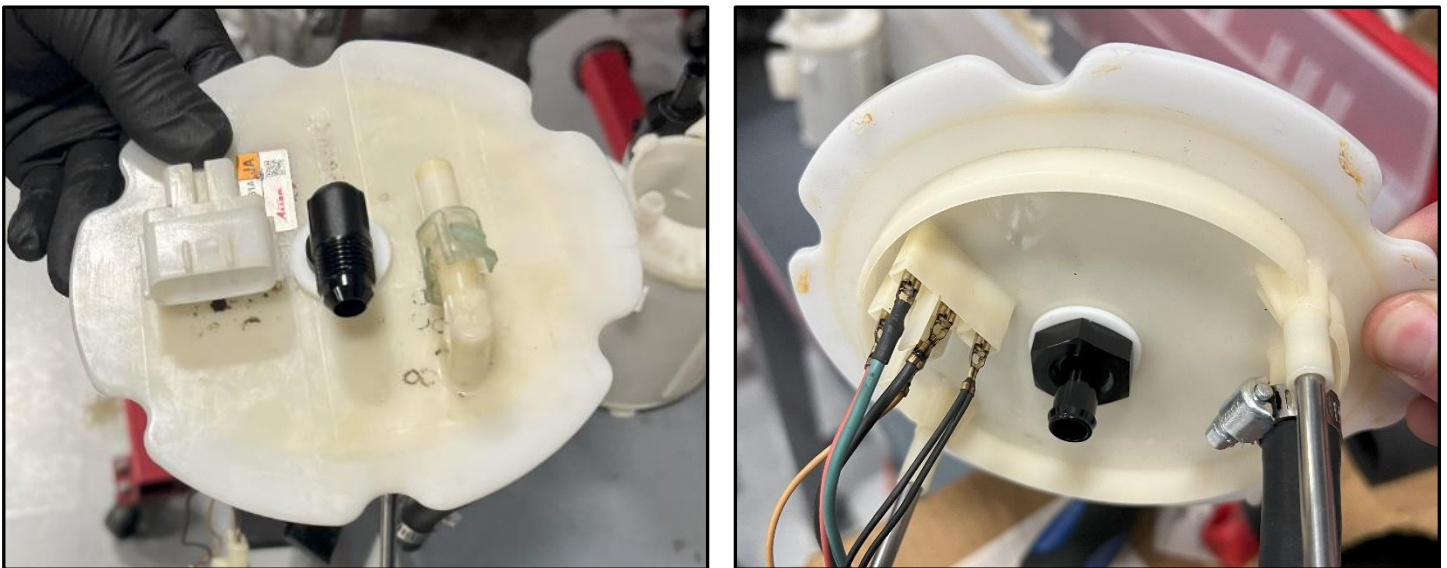
**Steps 63-72 are only for customers who are using the stock top hat.**

63. Using a 9/16" drill bit or step drill bit, drill a hole in the center of the stock top hat (shown below in *Figure 26*).



*Figure 26*

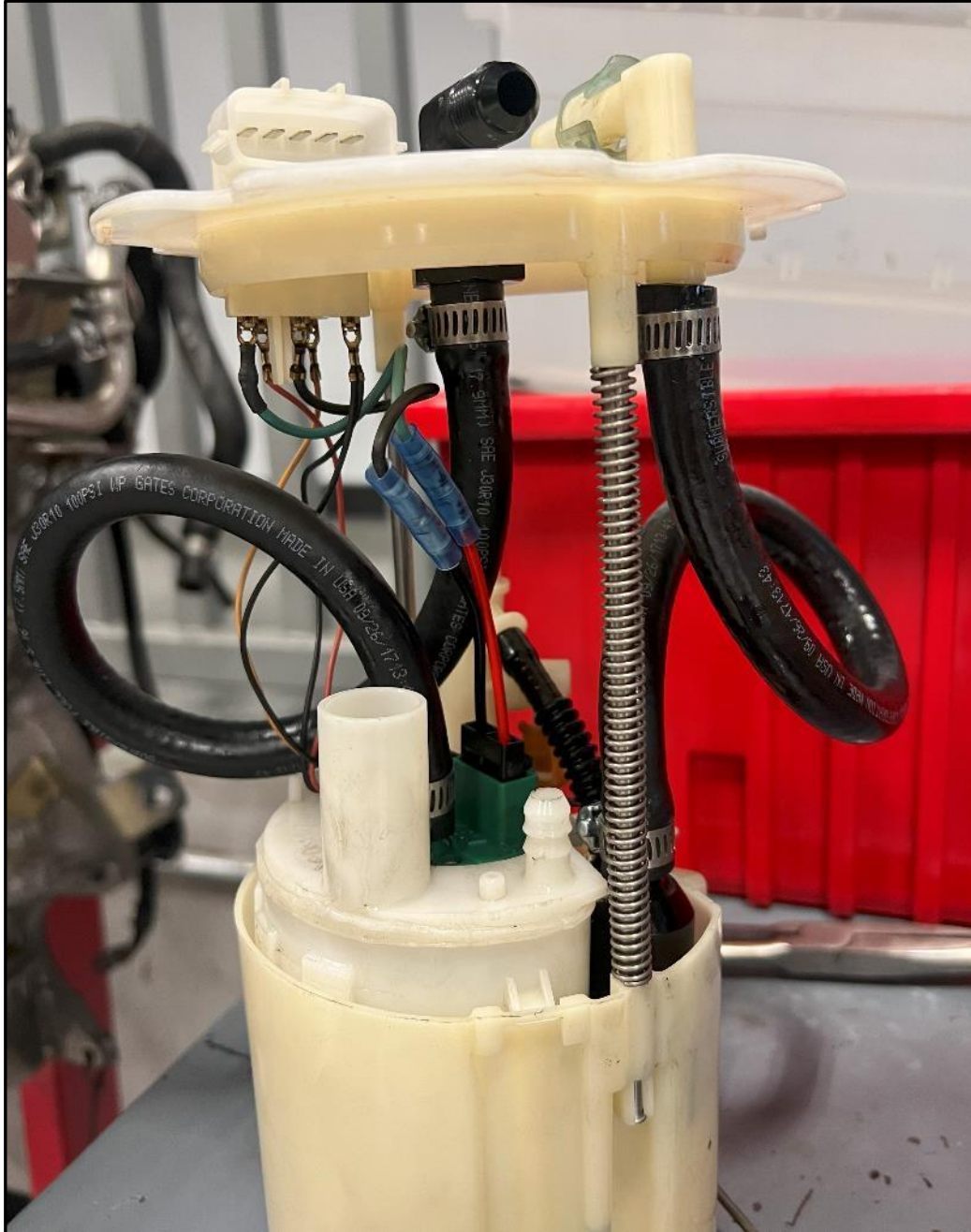
64. With a supplied PTFE washer on each end, install the 90° 6AN Bulkhead fitting into the hole. Secure with the supplied 6AN bulkhead nut. *Figure 27*.



*Figure 27*

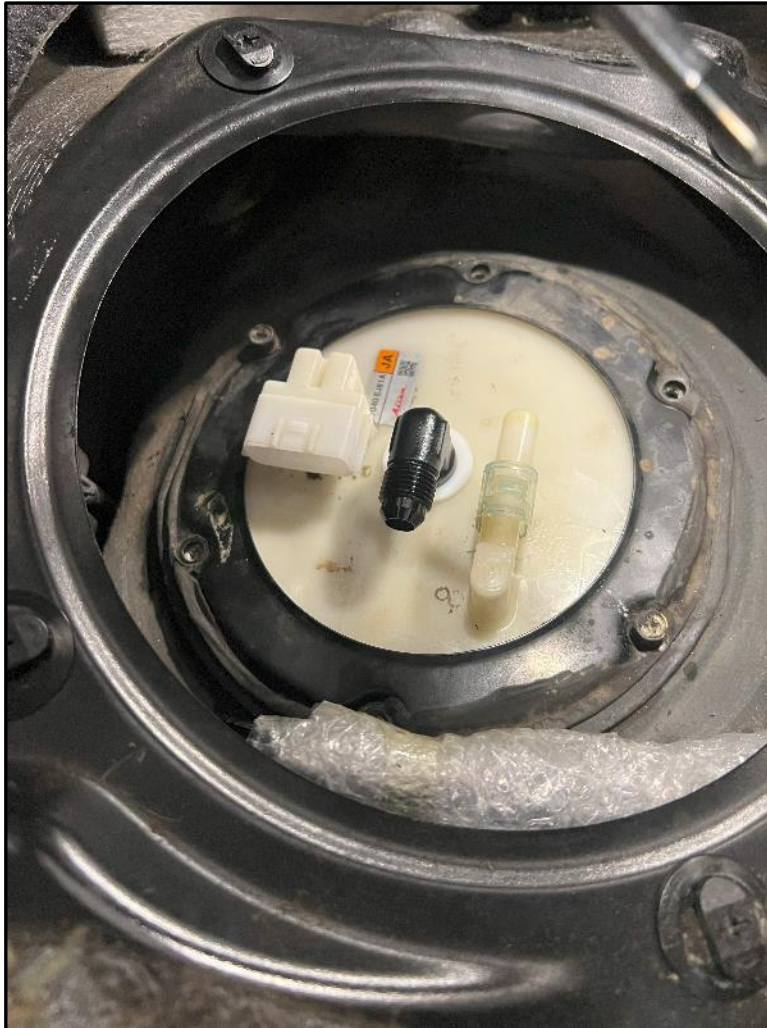
65. Install the plastic collars and springs onto the top hat rods that were removed earlier, then install the stock top hat with the new bulkhead fitting onto the lower basket, secure with the locking collar that was removed in *Step 15*.

66. With a screw clamp on each end, install one 14" section of submersible rubber fuel hose onto the fuel pump outlet and other end onto the new bulk head fitting (shown below in *Figure 28*).
67. With a screw clamp on each end, install the other 14" section of submersible rubber fuel hose onto the fuel regulator delete barb and other end onto the stock barb on the top hat (shown below in *Figure 28*).
68. Using (2) two provided butt-connectors, wire up the new fuel pump to the fuel pump wiring on the stock top hat (shown below in *Figure 28*).



*Figure 28*

69. Take the assembled fuel basket over to the vehicle.
70. Carefully install the fuel basket assembly into the fuel tank. Be careful not to bend the fuel level sensor or pinch/cut the submersible fuel hose on the fuel tank opening. Make sure to also reconnect the siphon hose from inside the tank. *Figure 29.*



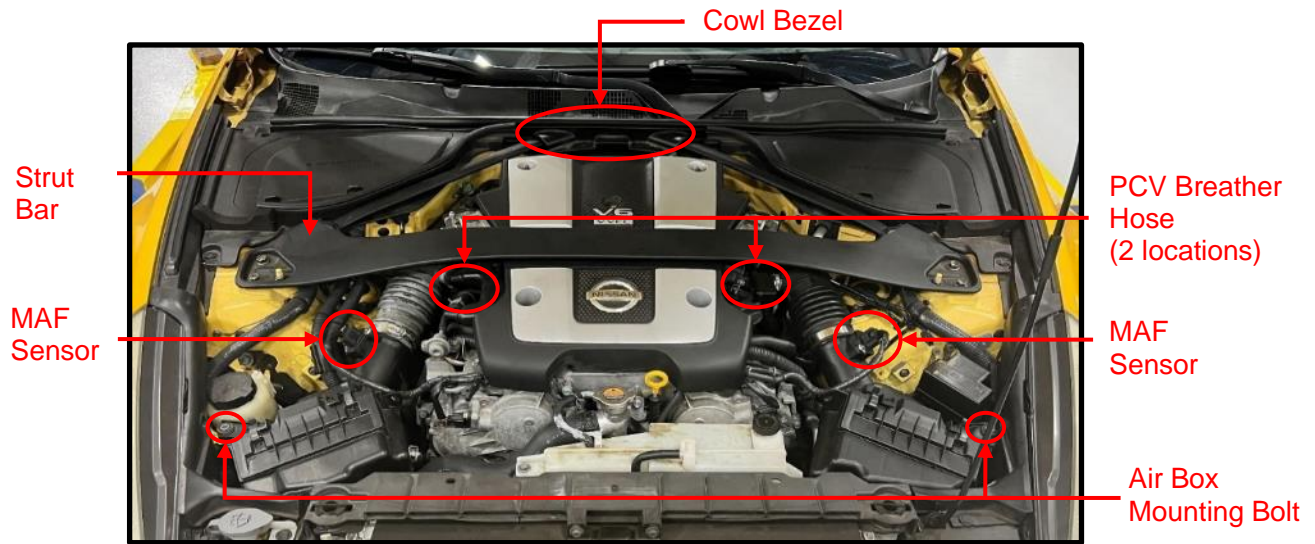
*Figure 29*

71. The fuel basket should rest on the bottom of the tank and will need to be compressed a small amount, roughly 5mm, to secure the top hat. Secure the top hat to the fuel tank with the (6) six provided M5 x 6mm socket head bolts. Connect the new chassis side harness connector to the Z1 top hat.
72. For 525 pumps you will need to install the included fuel pump relay kit. Refer to the instructions provided with that relay kit for installation.



## Fuel Rails:

**NOTE:** Use the diagram below as reference for the *Steps 1-10*. G37 owners should follow the same steps but ignore the steps about removing the cowl bezel and strut bar. *Figure 30*.



*Figure 30*

1. Remove the (2) two plastic clips which attach the Cowl Bezel to the Cowl Assembly.
2. Carefully pry loose backside of the Cowl Bezel. Firmly pull on the Cowl Bezel and set aside.
3. Remove (4) four bolts and (2) two hex nuts which attach strut bar to chassis. Remove strut bar and set aside.
4. Remove nuts and bolts which attach engine cover to engine. Remove cover and set aside.
5. Locate and unplug (2) two MAF sensor connectors as well as any plastic harness clips that may be attached to the air box.
6. Remove (1) one bolt which attaches passenger side intake canister to plenum (near passenger side PCV hose).
7. Loosen hose clamps and remove OEM PCV Breather hoses at each valve cover end.
8. Loosen large hose clamp at each throttle body.
9. Remove air box mounting bolt which attaches each OEM air box to chassis.
10. Using a light pull motion, remove OEM air boxes and intake tube assemblies.

Use the diagram below as reference for Steps 11-21:

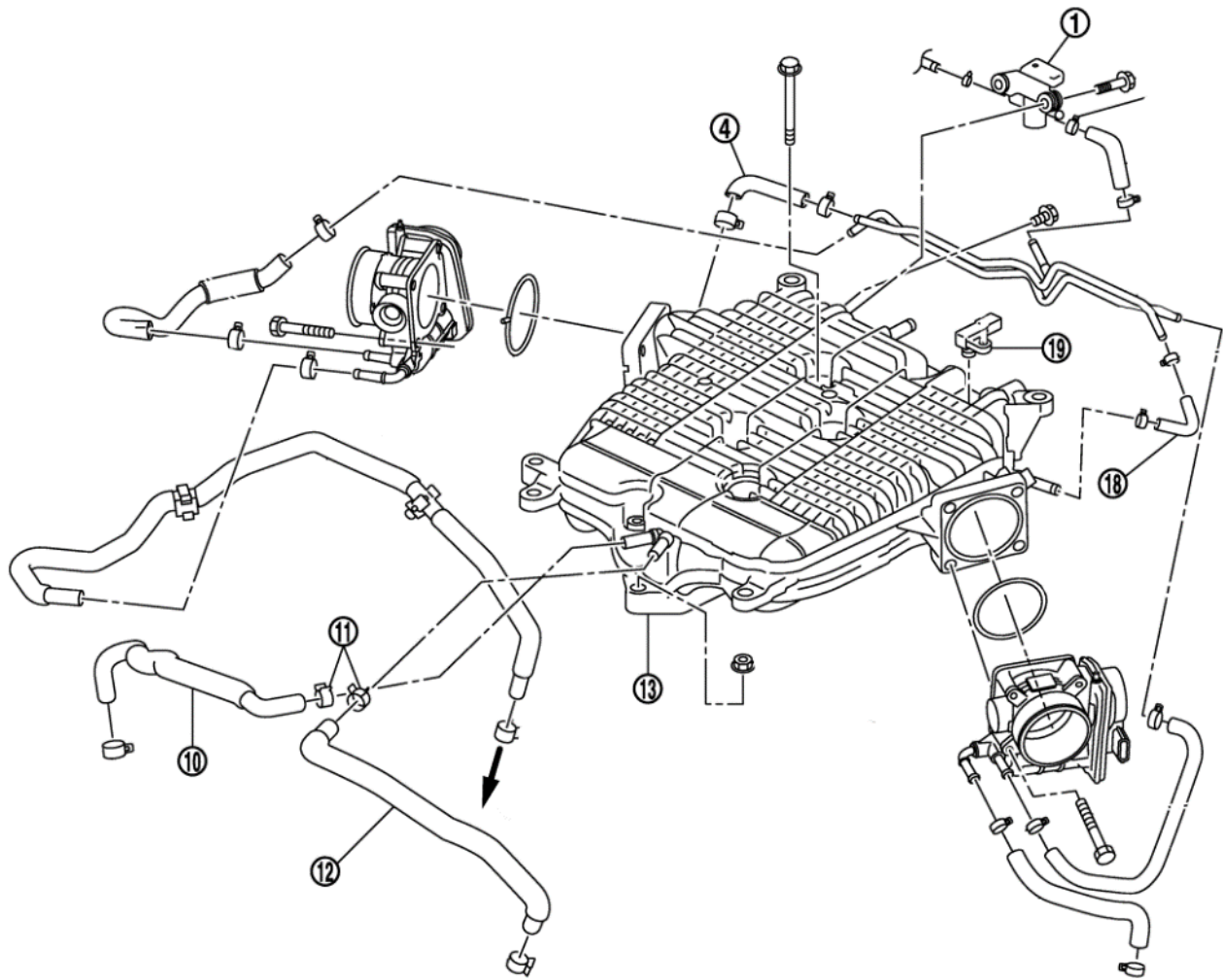
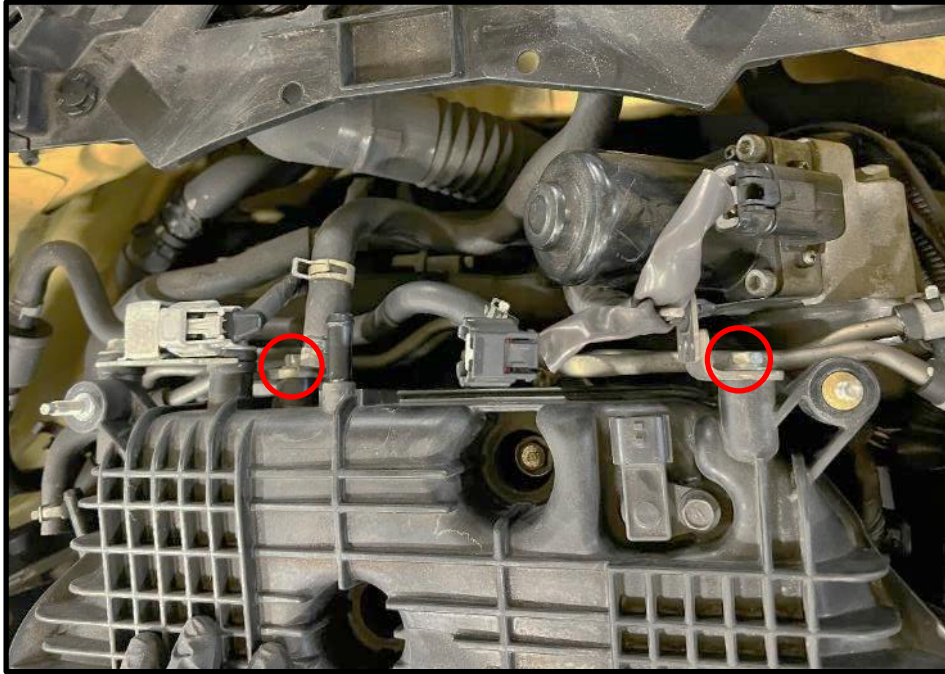


Figure 31

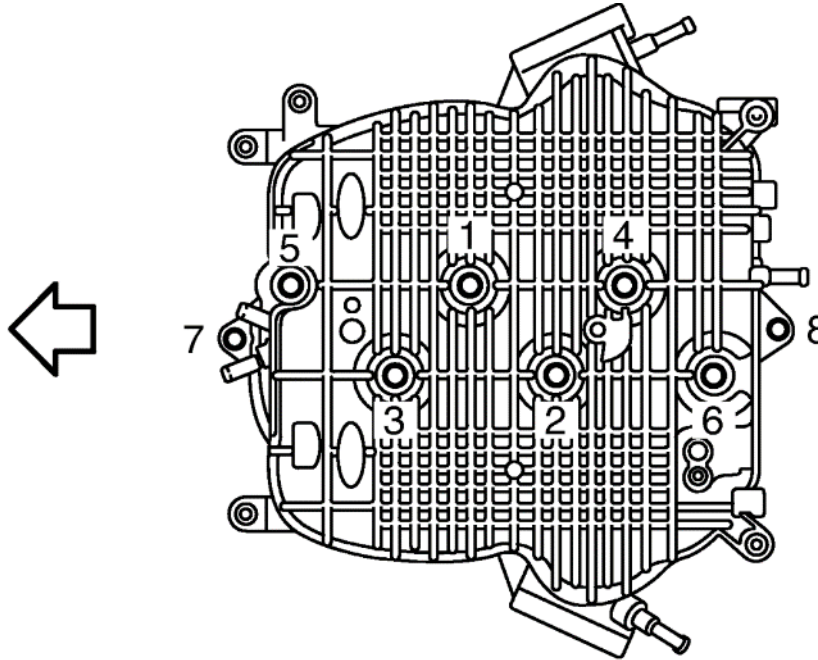
11. Loosen hose clamps ⑪ and remove OEM PCV Breather hoses ⑩ & ⑫ at the front of the intake plenum.
12. Using a 5mm hex bit, remove the (4) four bolts on each throttle body which attach it to the intake plenum.
13. Loosen hose clamps and remove hoses ④ & ⑱ that connect to the intake plenum behind each throttle body.
14. Remove (2) two bolts securing EVAP canister purge control solenoid valve ① to intake plenum.
15. Loosen hose clamp and remove brake booster hose connected to back of intake plenum (circled above, Figure 31).
16. Disconnect MAP electrical connector ⑲ at back of intake plenum.

17. Remove (2) two bolts which attach brackets for the tube assemblies to the back of the intake plenum (circled below, *Figure 32*).



*Figure 32*

18. Remove (8) eight nuts and bolts securing intake plenum to engine in reverse order (8-1) as shown in *Figure 33* below.

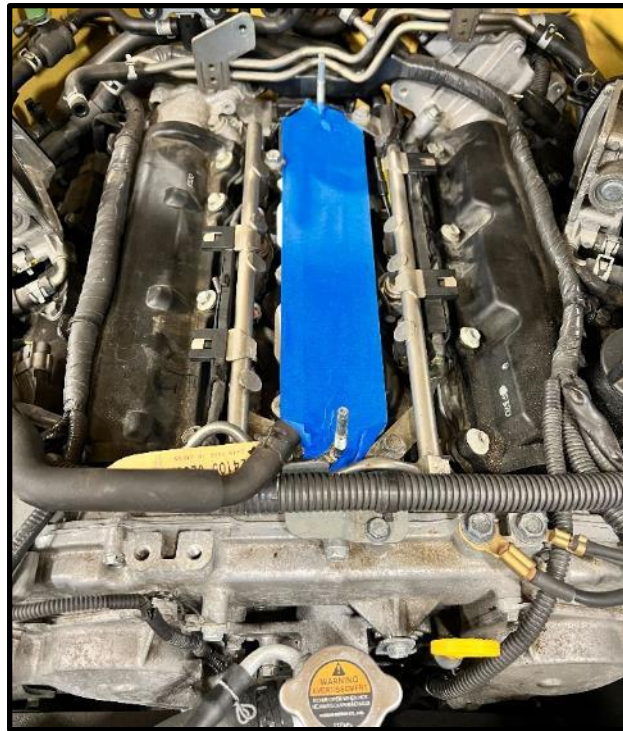


*Figure 33*

19. Inspect intake plenum and ensure there are no other hoses, connectors, or bolts securing it to the vehicle. Carefully lift up to remove intake plenum and set aside.
20. Clean and inspect Lower Plenum to Upper Plenum Gasket, replace if necessary.



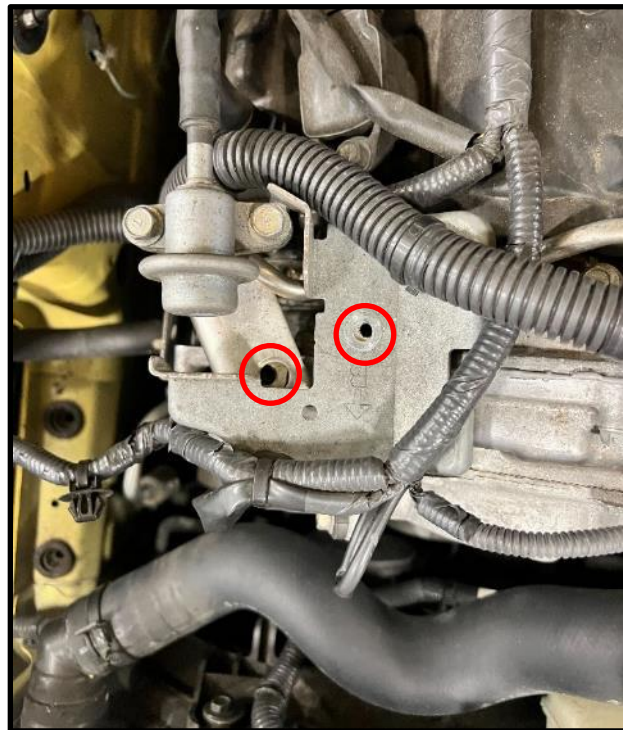
21. Cover the Intake Runners with tape, or place rags in them to prevent parts or debris from falling in the engine. *Figure 34.*



*Figure 34*

22. Remove (2) two bolts which attach harness & fuel line brackets to the front left of the engine (circled below, *Figure 35*).

**NOTE:** *Figure 35* shows the bolts already removed.



*Figure 35*

23. Place a rag around the fuel damper at the front of the fuel rail (circled below). While applying light pressure to the damper, loosen the (2) two bolts on the fuel damper. *Figure 36.*

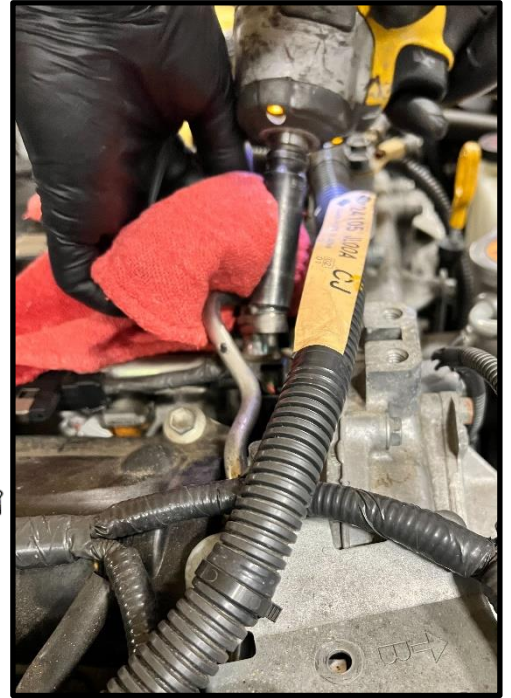
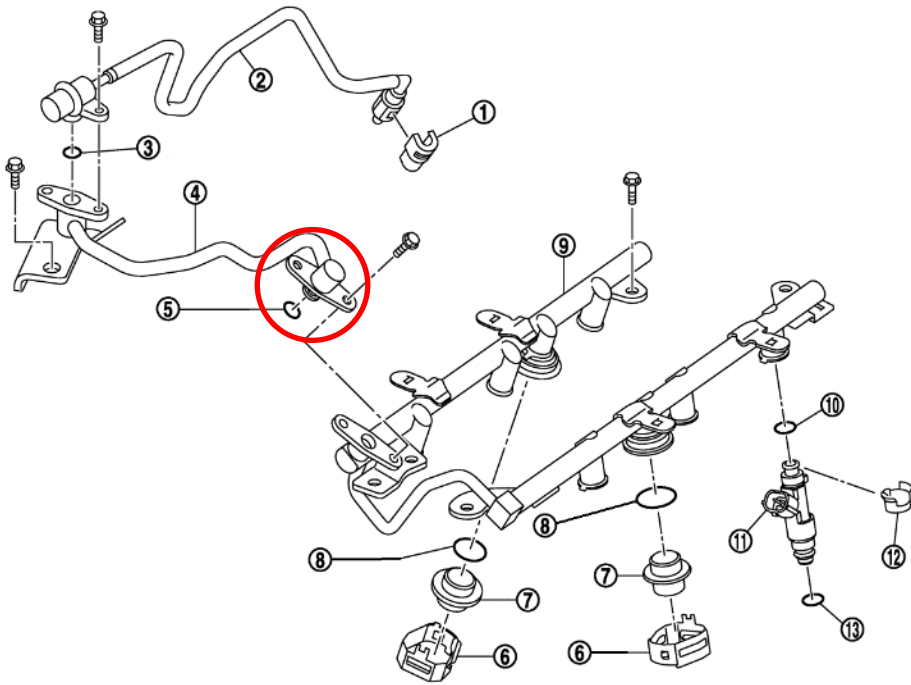


Figure 36

24. Carefully remove the Fuel Sub Tube (4) from the Fuel Rail (9). Inspect the O-ring on the damper, replace if necessary. *Figure 36.*

25. Loosen the (4) four bolts which attach the fuel rail to the lower intake plenum in reverse order as shown in *Figure 37* below.

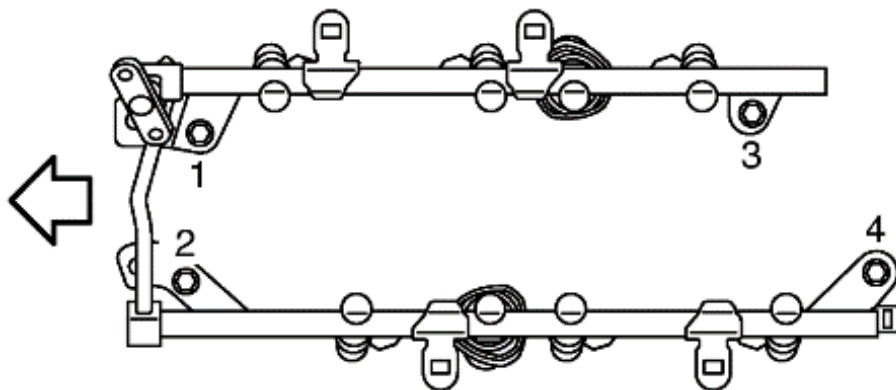


Figure 37



26. Carefully lift straight up on the front of the Fuel Rail to unseat injectors as shown in *Figure 38*.
27. Gently rotate the Fuel Rail to provide access to disconnect the electrical connector at the rear of the fuel rail as shown in *Figure 38*.

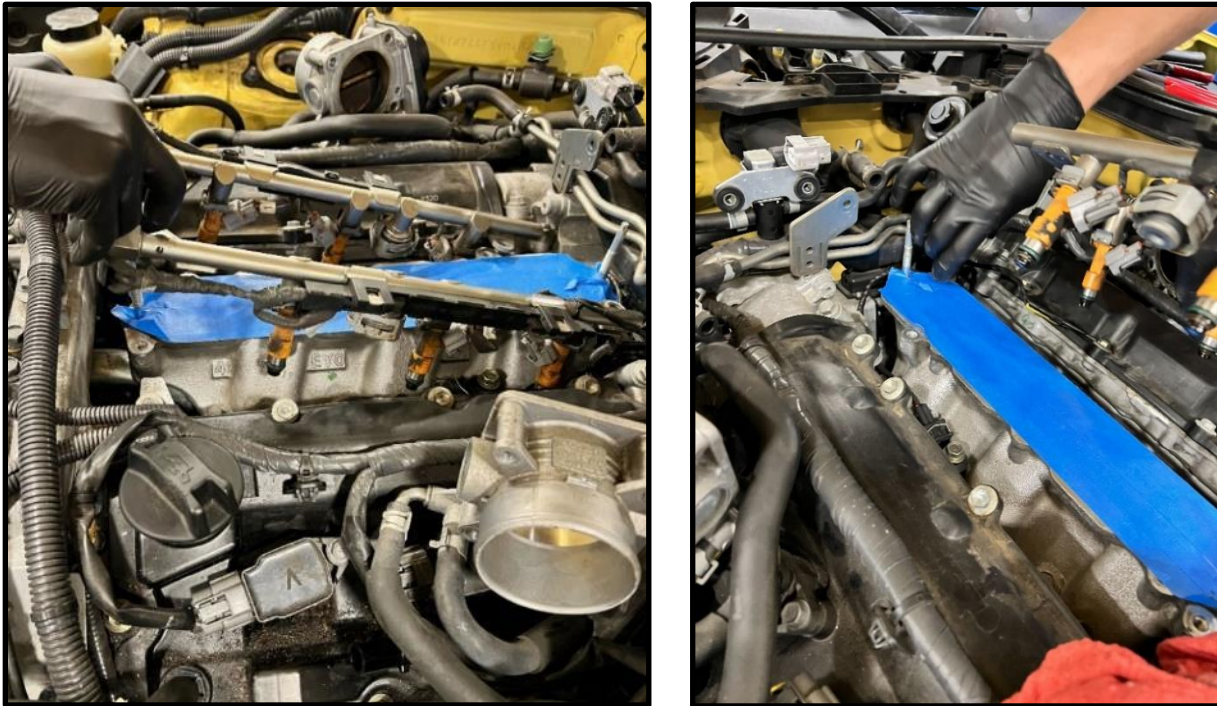


Figure 38

28. With the fuel rail and old injectors removed, inspect the lower intake plenum where the fuel injectors sit. Remove any o-rings that may still be present and clean the area of any debris, oil, or fuel.
29. Disconnect the harness connector at each fuel injector.
30. Remove the fuel injector sub-harness from the OE rails.
31. Open and remove the clip (3) securing each fuel injector to the fuel rail. These can be removed by pressing down on the tapered edge on each side to unseat them from the fuel rail or by pushing straight back away from the electrical connector. *Figure 39*.
32. Remove each fuel injector from fuel rail by pulling straight up.
33. Remove clip (3) from the mounting groove (F) in each injector. Inspect the clips and replace if necessary. *Figure 39*.

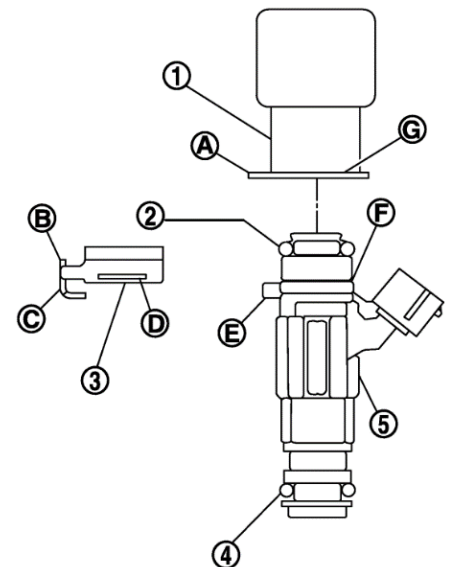


Figure 39

**NOTE:** Nissan’s Factory Service Manual (FSM) recommends replacing these clips as well as a few other parts here after every disassembly. It can be found [here](#), or if you search “OEM VQ / VR Fuel Injector Clip” on our Z1 Motorsports website.

34. If you are re-using the OE injectors, inspect each injector and their o-rings.
35. If you did not purchase new fuel dampers, remove the retaining clips and both fuel dampers on the OE fuel rails. The clips will need to be opened to the unlocked position before the dampers can be removed. Once removed check the condition of the o-rings. If damaged purchase new ones ([link to new o-rings](#)).
36. If you are using aftermarket injectors, like the [Z1 370Z / G37 1000cc Drop-In VQ Fuel Injectors](#), locate them at this time.
37. Locate the Z1 Fuel Rails. Remove the (2) two screws on each side and remove the Fuel Damper Retainer on each fuel rail.
38. Install either your new Nissan fuel dampers and O-rings or the ones removed in *Step 35* into the Z1 Fuel Rails. Secure them with the Fuel Damper Retainer and the (2) two screws removed in *Step 37*.
39. With some petroleum jelly on the top o-rings, install the injectors onto the fuel rails. If you purchased the Z1 Injectors, refer to the instructions provided for the orientation of each injector.
40. With some petroleum jelly on the bottom o-rings, carefully position fuel rail and fuel injector assemblies into lower intake plenum with the Z1 logos on the rails facing the front. Reference *Figure 40* below.

**NOTE:** Be careful not to let the tip of the injector nozzle contact other parts.



*Figure 40*

41. Secure the rails to the lower intake plenum with the OE bolts removed in *Step 25*. The rails should be torqued in two steps, starting at the front then the rear.
  - 1<sup>st</sup> step: 7ft-lbs
  - 2<sup>nd</sup> step: 17ft-lbs
42. Reconnect injector connector sub-harness to the injectors and to the chassis harness that were disconnected in *Steps 29-30*.

## Fuel Pressure Regulator:

1. Your Z1 Fuel Pressure Regulator will arrive mostly assembled with the exception of ORB fittings/plugs for the fuel lines.
2. Below shows the Fuel Pressure Regulator and what each component/port is used for. *Figure 41.*

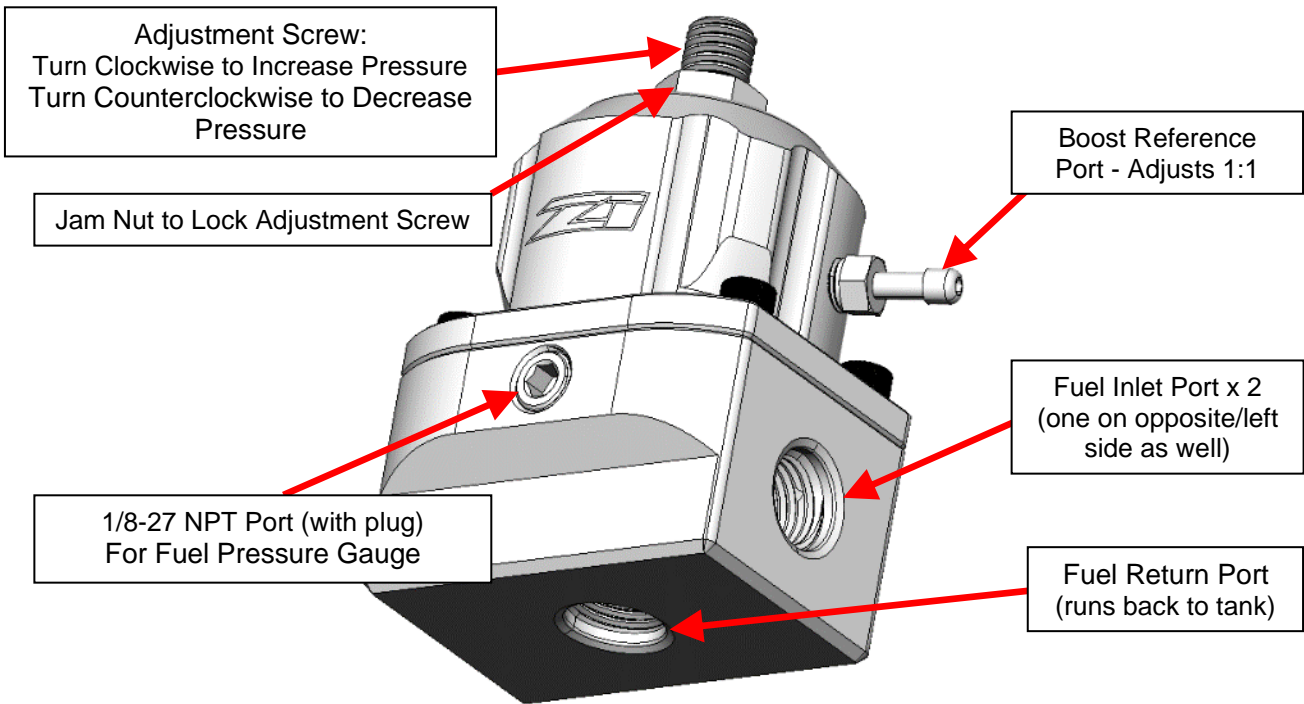


Figure 41

3. Install the (2) two 6AN ORB fittings on the bottom and right side of the regulator. Install the 6AN plug on the left side of the regulator. Remove the plug on the front, and with thread sealant install the fuel pressure gauge.
4. Remove the passenger side plastic battery cover and cowl trim piece.
5. Remove the universal bracket that comes on the regulator. Retain the hardware.

**370Z Owners:** Attach the other provided L-shaped bracket onto the rear of the regulator with the bolts removed in *Step 5. Figure 42.*

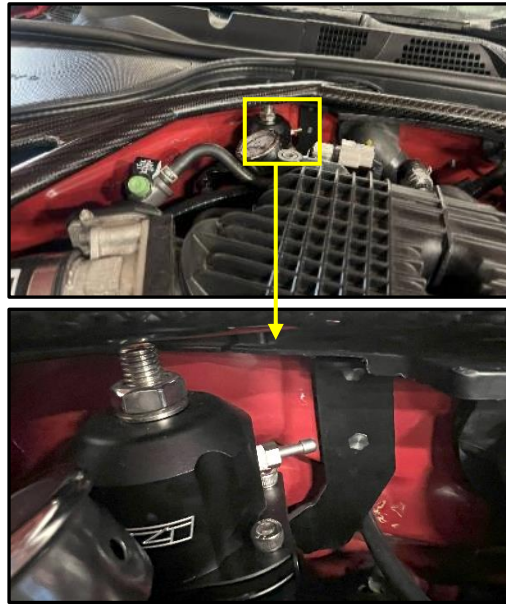
**G37 Owners:** Attach the other provided angled bracket onto the rear of the regulator with the bolts removed in *Step 5. Figure 42.*



Figure 42

**It is recommended to skip to the fuel line section on *Page 35* before continuing. Your fuel return line will connect to the bottom of the regulator and will be easier to install if the regulator is not mounted yet.**

6. Install the (2) two rubber bonded washers onto the PEM studs on the L-shaped bracket.
7. Attach the regulator and bracket to the two holes on the false firewall, secure with the provided nuts. *Figure 43.*



*Figure 43*

8. Consult your tuner on whether or not they would like to use boost reference for the regulator.



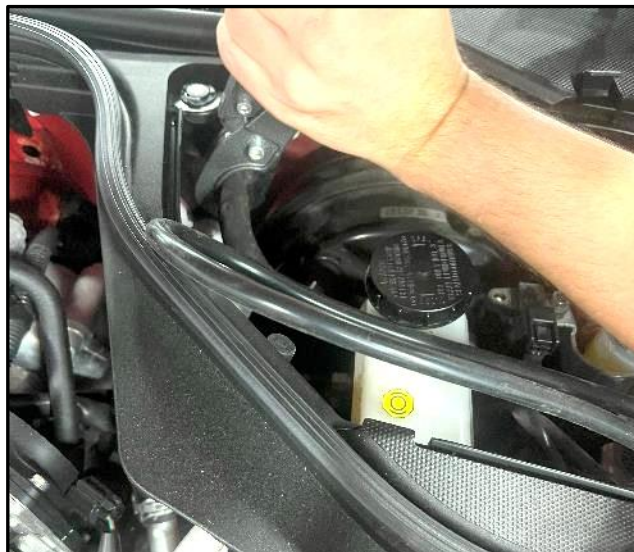
9. If you need boost reference, locate the 5mm silicone vacuum hose, 3/8" to 1/4" reduction tee fitting, (2) two small spring clamps, and (2) two large spring clamps. We recommend plumbing the supplied reduction tee fitting into the brake booster vacuum hose that runs to the rear of the upper intake plenum. There are several different spots you can tee into; a couple options are shown below:

- a. Below shows the easiest spot right off the back of the intake plenum. *Figure 44.*



*Figure 44*

- i. Remove the brake booster hose. (You can trim it shorter if you'd like but it is not necessary)
  - ii. Cut the brake booster hose in the longest straight part of the hose.
  - iii. Install the reduction tee into the brake booster hose.
  - iv. Install the 5mm vacuum line onto the 1/4" barb of the tee fitting.
  - v. Make sure all connection points are secured with a clamp.
- b. You can also tee into the brake booster hose after it routes behind the firewall and towards the brake booster compartment for a cleaner looking installation. *Figure 45.*



*Figure 45*

- i. The brake booster hose has a check valve in the line near the brake booster. Feel/squeeze the hose to locate the check valve.
- ii. Cut the hose anywhere between the check valve and the upper plenum (shown below).
- iii. Install the reduction tee in between the cut brake booster hose.
- iv. Install the 5mm vacuum line onto the 1/4" barb of the tee fitting.

10. Once the vacuum line is tee'd into the brake booster hose, route the line to the barb fitting on the regulator. Secure with small spring clamp.
11. Make sure all connection points are secured with a clamp.

## Fuel Lines and Fuel Filter:

1. Remove the protection panel on the underside of the vehicle that covers up the OE fuel and brake lines (shown below in *Figure 46*).



*Figure 46*

- With the Z1 Fuel Return Kit, the OE Fuel Feed Line will function as the return line back to the tank. The Feed hardline will need to be disconnected from the rubber feed hose connected to the damper at the front of the engine. The OE rubber hose connects to the OE hardline on the inside of the passenger side frame rail with a quick connector. Remove the plastic cover shown with a red arrow below in *Figure 47*. Then separate the lines just like the one from *Step 9, Fuel Pump Upgrade and Top Hat Kit*.

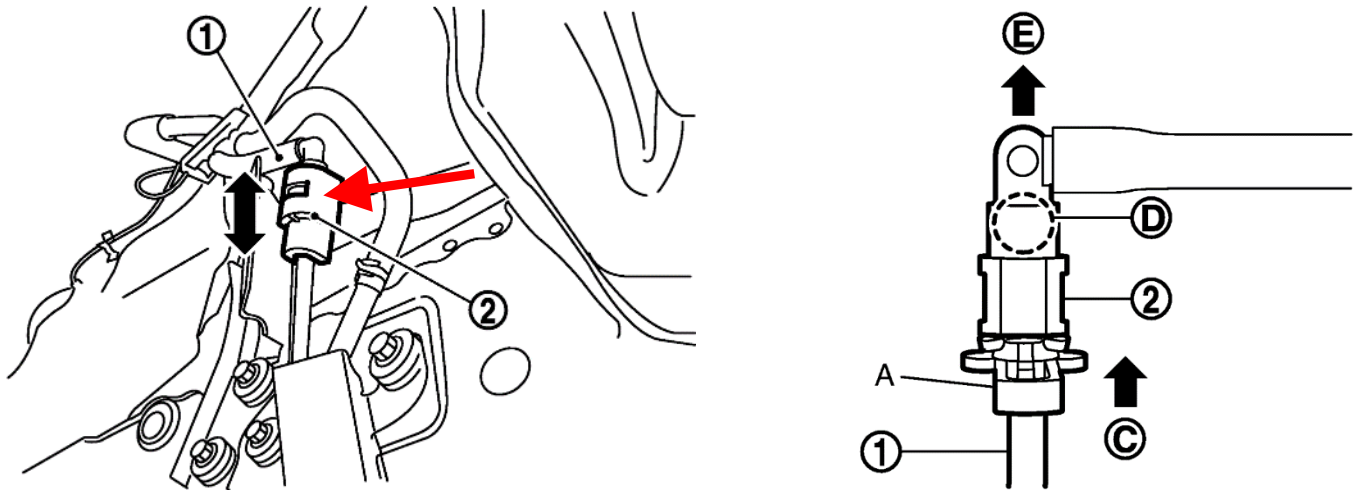


Figure 47

- Remove the release piece from the OE hardline if it did not come off with the rubber hose. *Figure 48*.

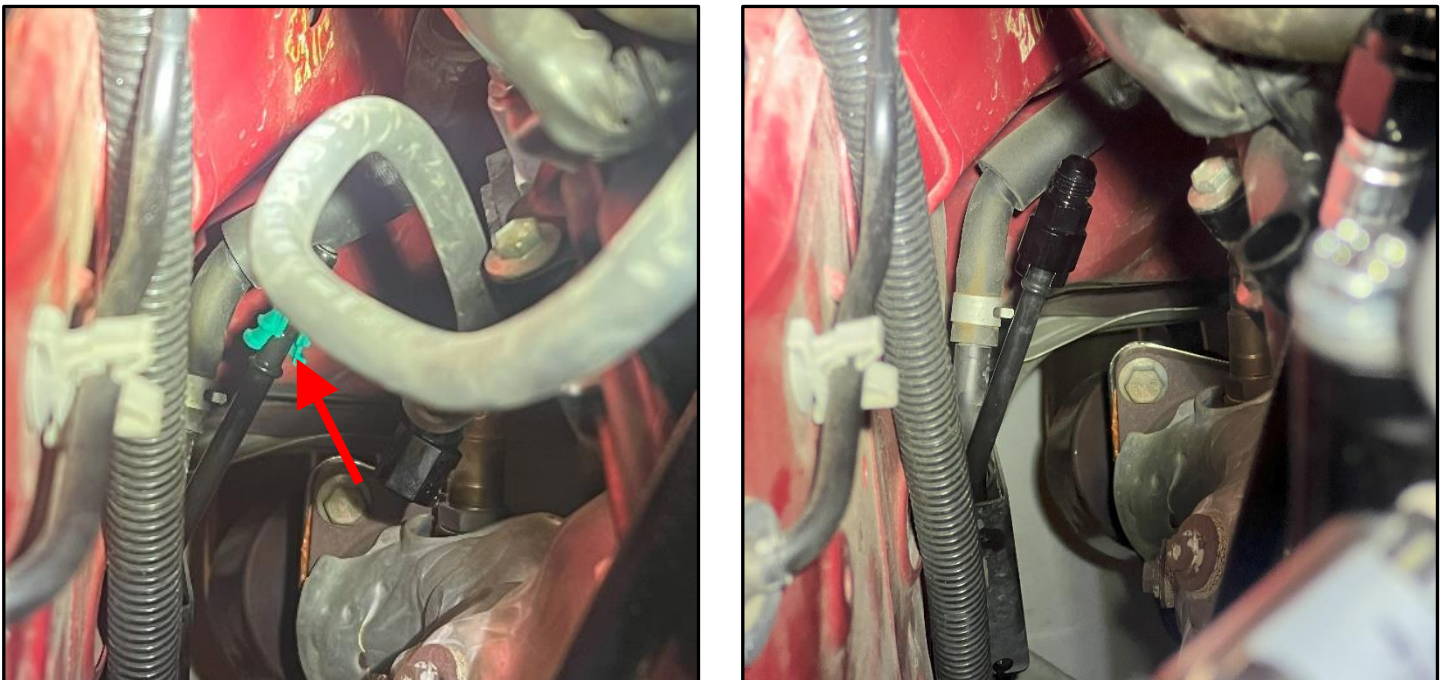


Figure 48

- Install the provided 5/16" (smaller) billet quick disconnect threaded adapter onto the OE hardline.



5. Locate the Fuel Line kit. The kit contains (8) eight different lines. Each line will be bagged individually with a part number on the bag. Do not separate the line from its bag until you are ready to install it. These lines have a PTFE core that if kinked cannot be un-kinked. Be careful when routing and maneuvering these lines, if you kink one you will need to order a replacement. **DO NOT** overtighten the fuel line fittings or use any additional sealant on the lines. Refer to the diagram below as reference to how each one will be run.

The chart below details all (8) eight provided fuel lines and what each fitting connects to.

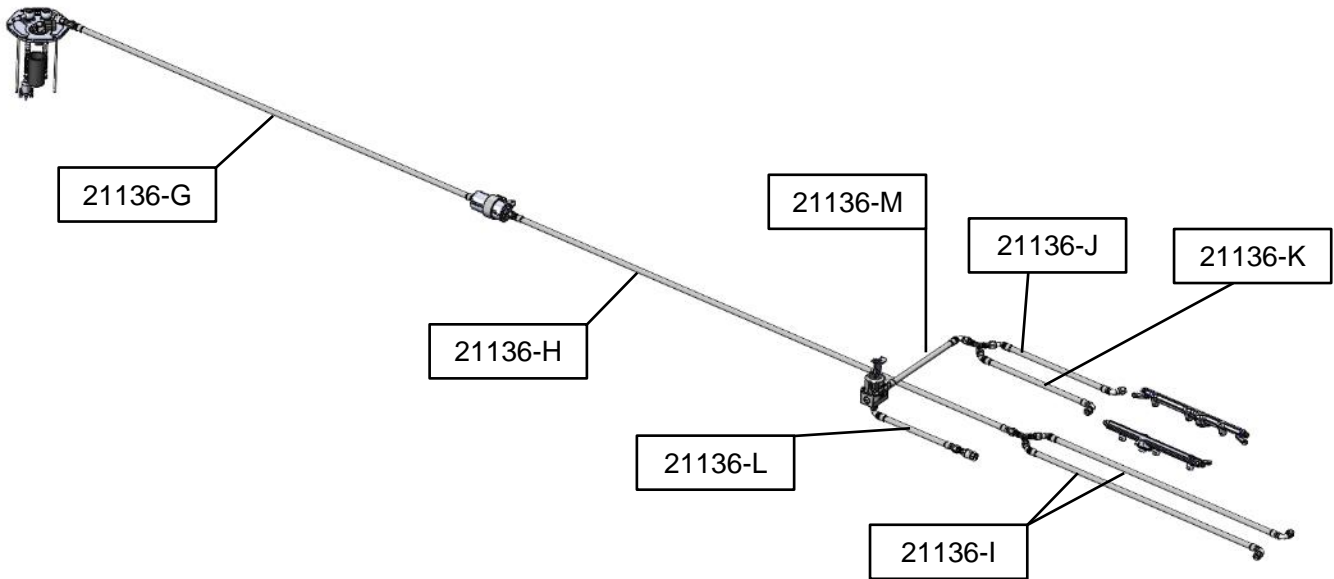
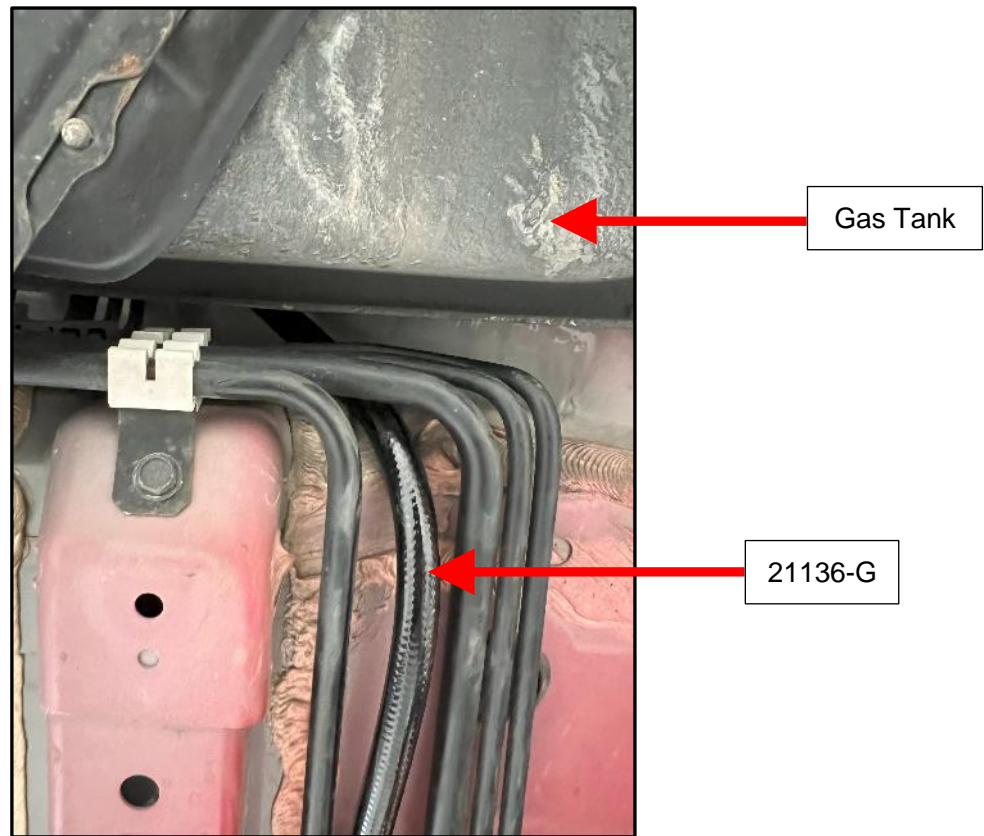


Figure 49

PN	Desc.	Fitting #1	Fitting #2
21136-G	Top Hat Outlet → Fuel Filter Inlet	Straight – Top Hat Outlet	Straight – Fuel Filter Inlet
21136-H	Fuel Filter Outlet → Single Y-Adapter	Straight – Fuel Filter Outlet	Straight – Single Side of Y-Adapter
21136-I	Dual Y-Adapter → Front of Fuel Rails	45° - Dual Side of Y-Adapter	90° - Front of Fuel Rails
21136-J	Rear of Driver Fuel Rail → Dual Y-Adapter	60° - Rear of Driver Fuel Rail	45° – Dual Side of Y-Adapter
21136-K	Rear of Pass. Fuel Rail → Dual Y-Adapter	90° - Rear of Pass. Fuel Rail	45° – Dual Side of Y-Adapter
21136-M	Single Y-Adapter → Side of FPR	90° - Single Side of Y-Adapter	Straight – Side of FPR
21136-L	Bottom of FPR → OE Feed Line	90° - Bottom of FPR	Straight – Fitting on OE Feed Line

- From the underside of the car, push the pump feed line (21136-G) up between the chassis and the front of the fuel tank towards the Fuel Pump Top Hat. *Figure 50.*



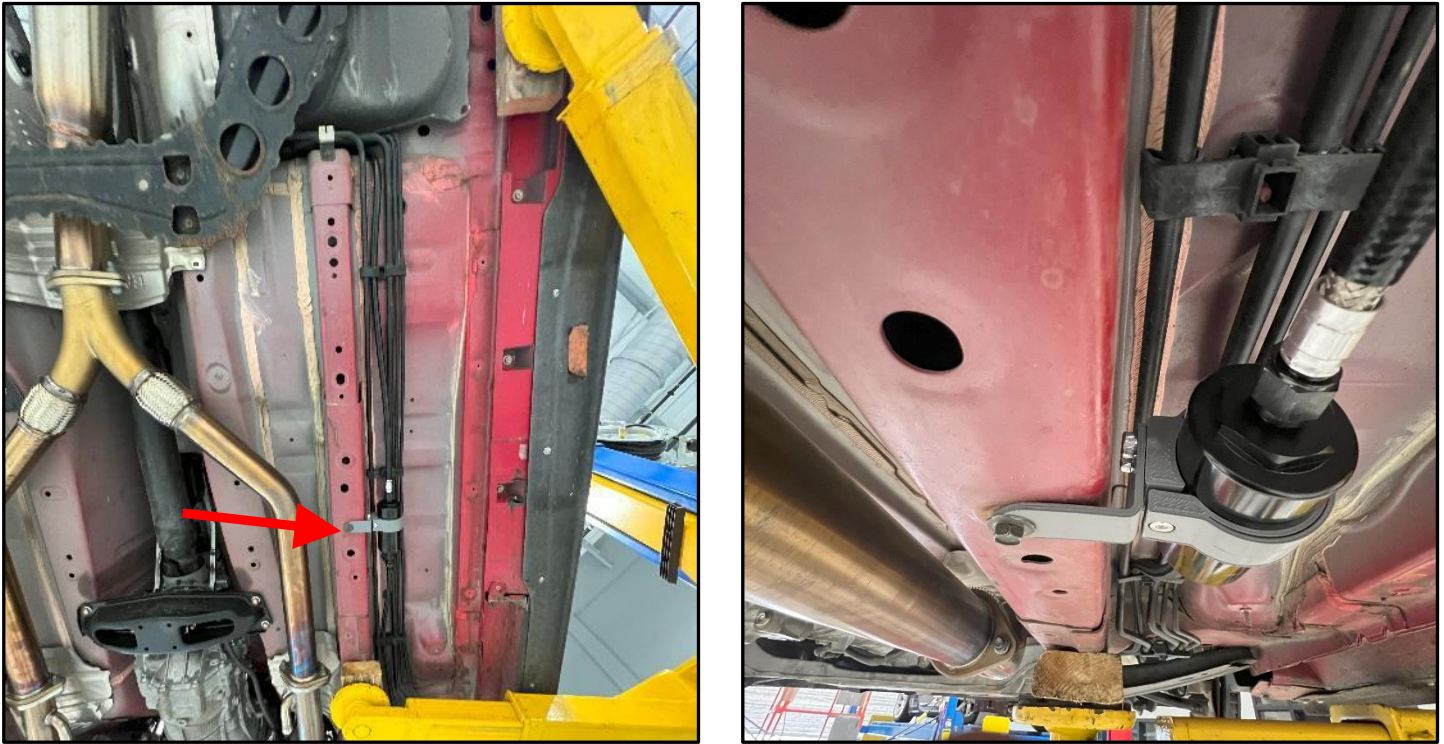
*Figure 50*

- Inside the vehicle, grab the Feed Line and pull it towards the top hat, but do not install it yet.
- Route the rest of the Feed Line along the factory hard fuel line against the passenger side frame rail. There is an open spot on the hardline retaining clips, route the Z1 lines in that spot.
- Locate the Fuel Filter, Fuel Filter Mounting Clamp, Fuel Filter Mounting Bracket and (2) two M5 x 12mm Screws. Install the Mounting Bracket onto the clamp with the (2) two screws onto the Mounting Clamp. Install the Fuel Filter inside the Bracket Clamp and tighten the clamp with the longer bolt. *Figure 51.*



*Figure 51*

10. On the underside of the vehicle, secure the pump feed line to the **INLET** of the fuel filter. The filter is marked with “IN” and “OUT” on each fitting.
11. Loosely install the fuel filter bracket into the threaded hole on the bottom side of the passenger frame rail with an OE bolt removed in *Step 1*, shown below in *Figure 52*.



*Figure 52*

12. Install the Filter Outlet Fuel Line (21136-H) onto the outlet of the Fuel Filter. Route the rest of the line along the factory hard fuel lines against the passenger side frame rail towards the engine bay.

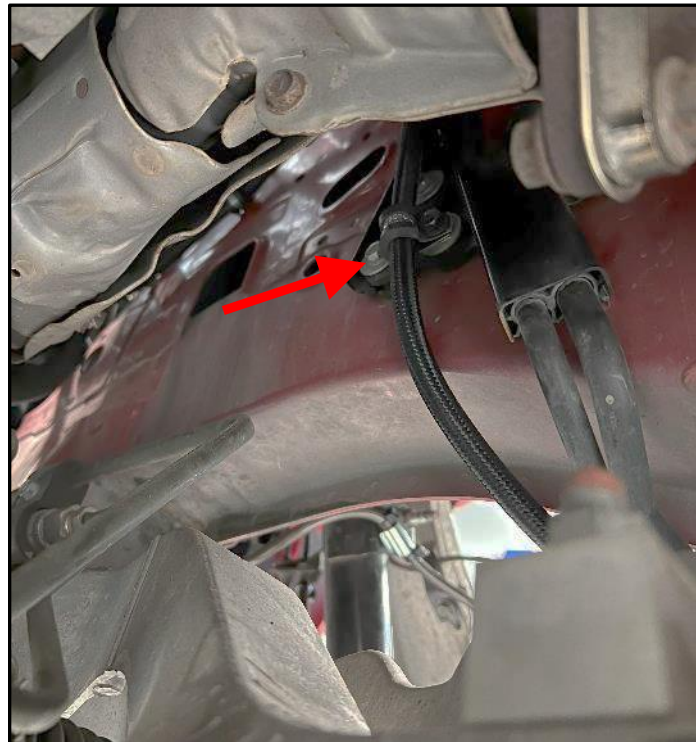


13. Once passed the frame rail, route the feed line over the suspension arm and up towards the engine, shown below in *Figure 53*.



*Figure 53*

14. Install the supplied Cushion Loop Clamp on the inside of the passenger side frame rail, secure the feed line to the bolt on the OE hard line bracket. *Figure 54*.



*Figure 54*

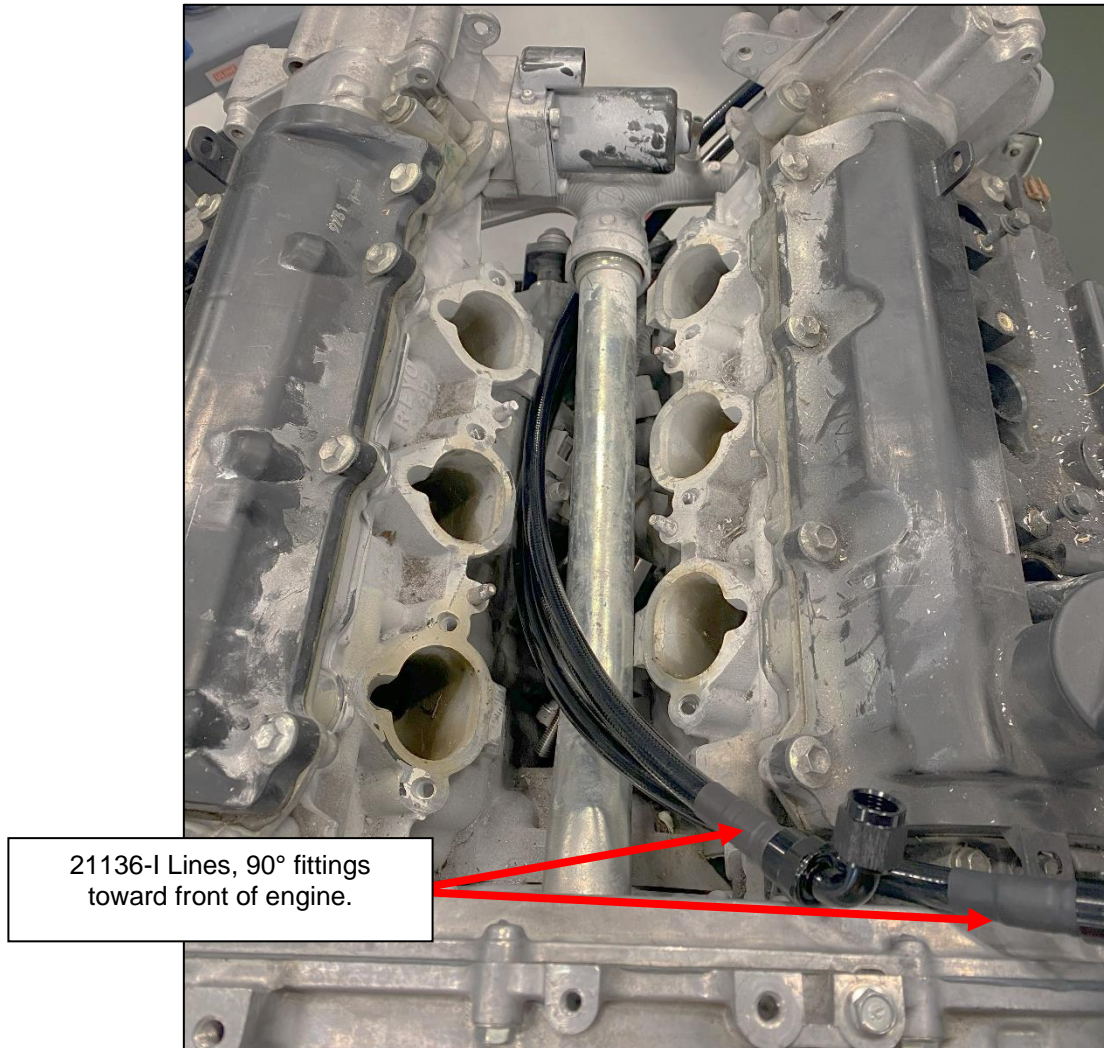
15. Route the feed line towards the rear of the engine.



**Reference Figure 49 on page 37 for Steps 16-26:**

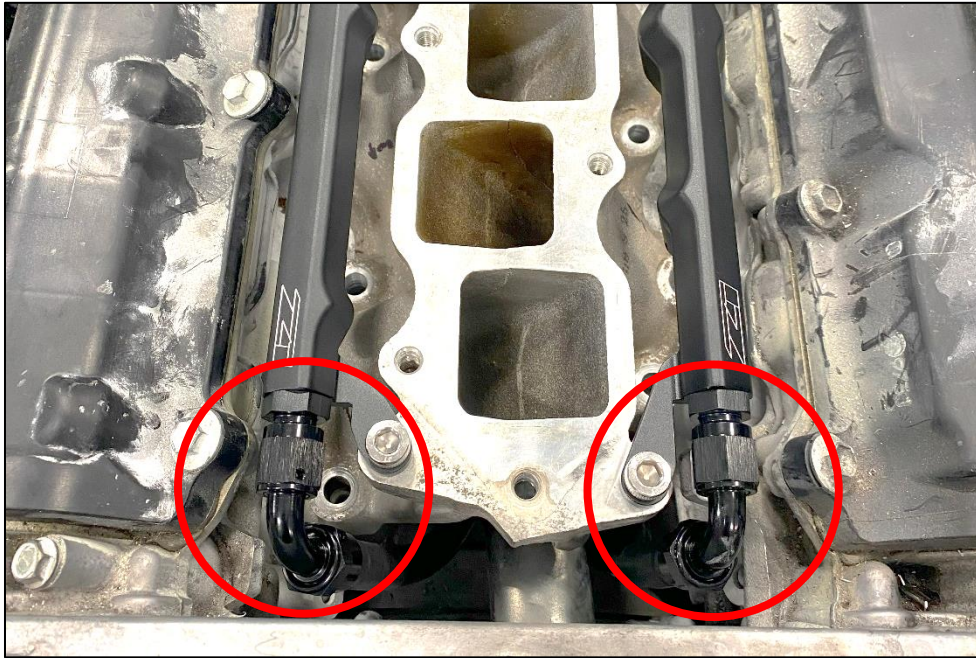
**NOTE:** The following Steps will be shown on an engine on an engine stand to help show proper routing. To help ease installation, we recommend removing the bolts for the Intake Lower Plenum, allowing you to lift the lower plenum and Fuel Rails to run and connect the Fuel Lines. **DO NOT** ovetighen the AN Fittings as this can cause leaks.

16. Locate (1) one 6AN Y-block fitting. Install the single side Y-adapter fitting onto the 21136-H feed line behind the engine installed in *Steps 12-15*.
17. Run the (2) two 21136-I feed lines underneath the middle of the lower plenum towards the front of the engine, with the 90° fittings towards the front of the engine. We found it easiest to remove the lower plenum to route the lines and connect the AN Fittings to the Z1 Fuel Rails. *Figure 55*.



*Figure 55*

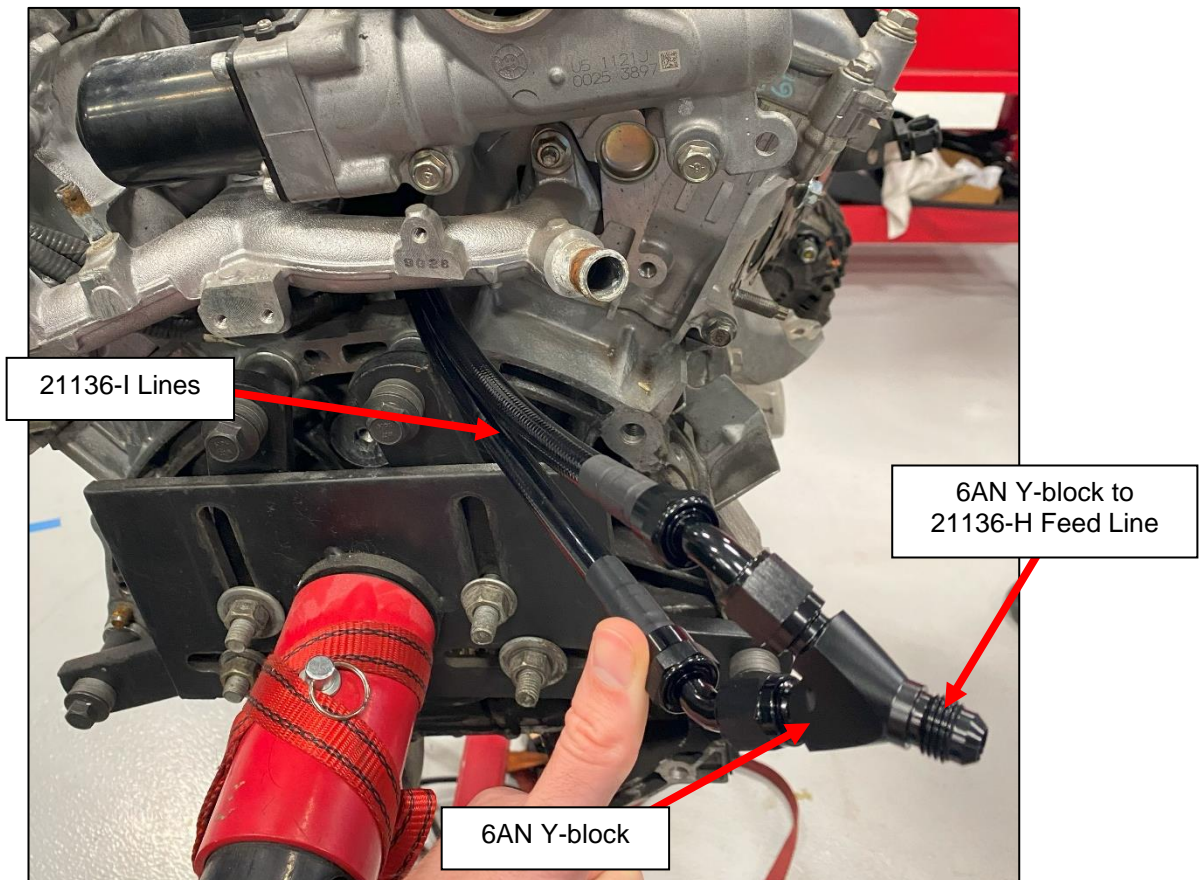
18. Install and tighten the 90° fittings of the short feed lines onto the fittings at the front of the Z1 Fuel Rails.  
*Figure 56.*



*Figure 56*

19. Install the 45° ends of both 21136-I lines onto the 6AN Y-block attached to 21136-H Feed Line in *Step 16*.  
*Figure 57.*

**NOTE:** Our 6AN Y-block is not yet attached to the 21136-H Feed line in *Figure 57* below.

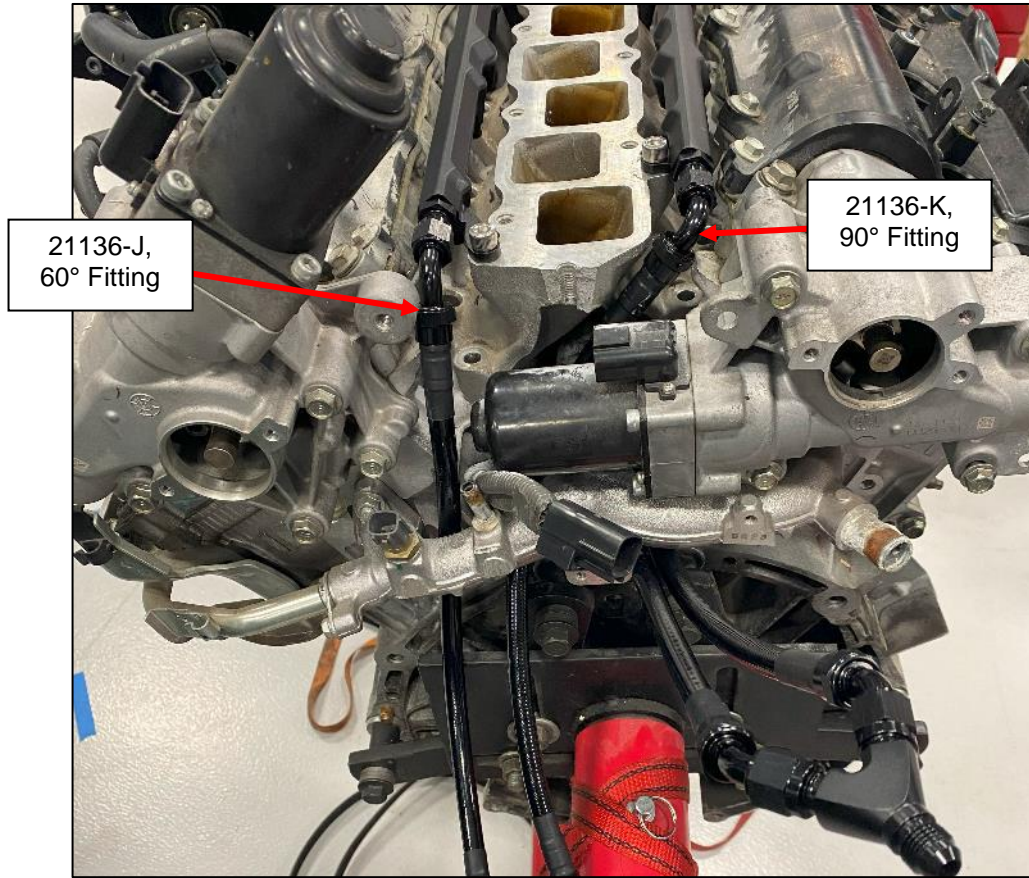


*Figure 57*



20. Locate the 21136-K line and the 21136-J line. Fish the lines behind the coolant crossover pipe on the back of the engine. 21136-K will have the 90° fitting towards the passenger side fuel rail, 21136-J will have the 60° fitting towards the driver side fuel rail. *Figure 58.*

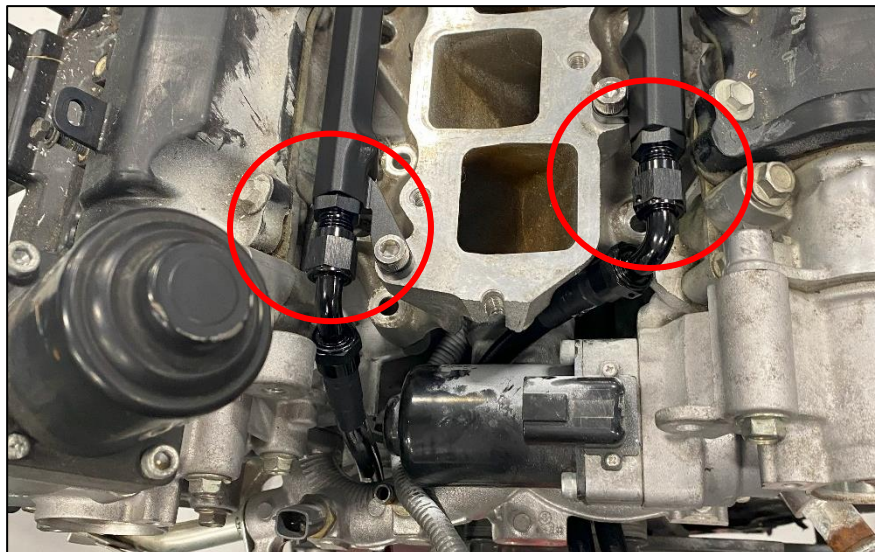
**NOTE:** Our lines are already attached to the Z1 Fuel Rails, you will do this in the next steps.



*Figure 58*

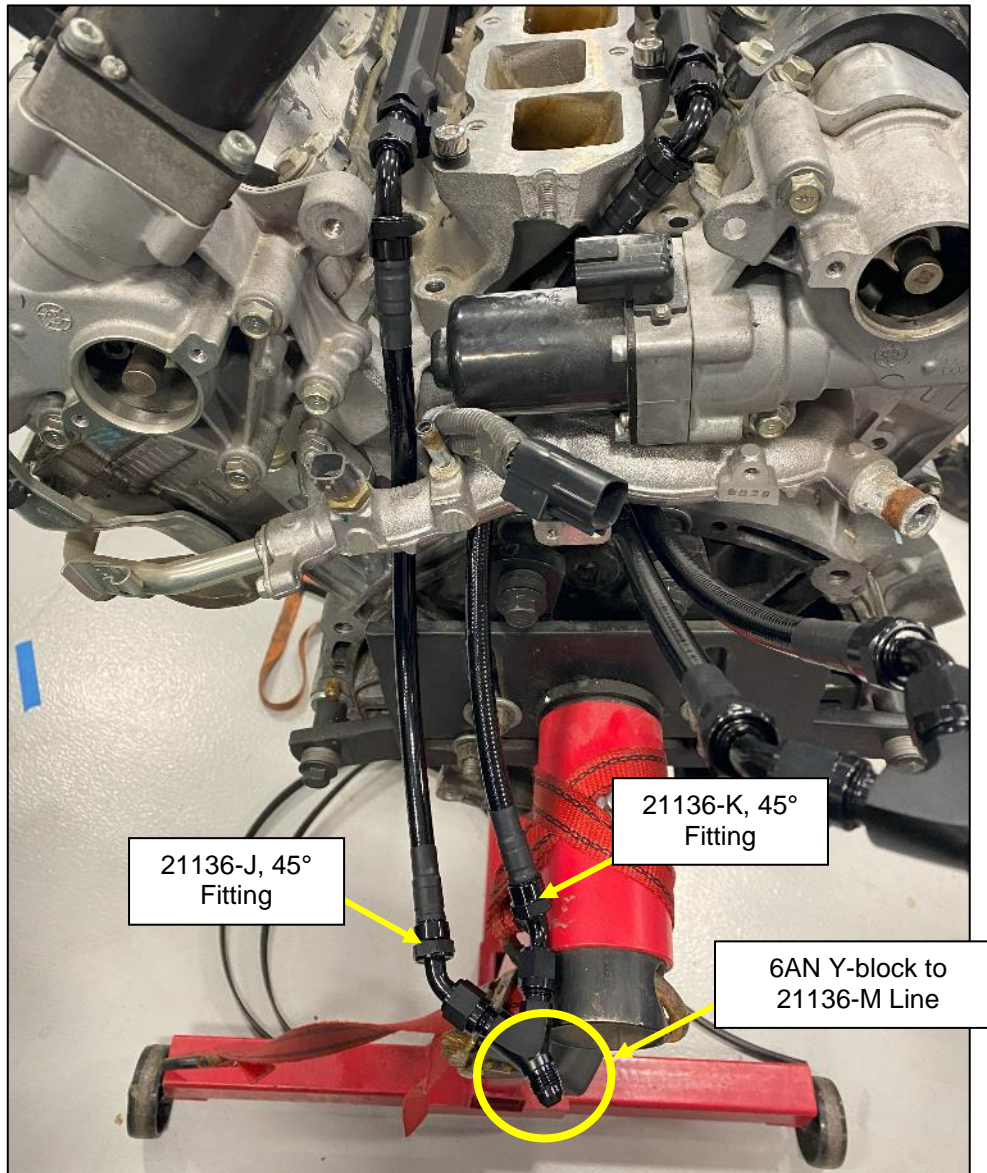
21. Install the 90° fitting on the passenger 21136-K line onto the rear of the passenger side fuel rail. *Figure 59.*

22. Install the 60° fitting on the driver 21136-J line onto the rear of the driver side fuel rail. *Figure 59.*



*Figure 59*

23. Connect the other 6AN Y-block onto the 45° fittings on both 21136-K and 21136-J lines coming off the back of the rails. *Figure 60.*
24. Install the 90° fitting on the 21136-M line onto the single side of the Y-block (Circled below) from the previous step. *Figure 60.*

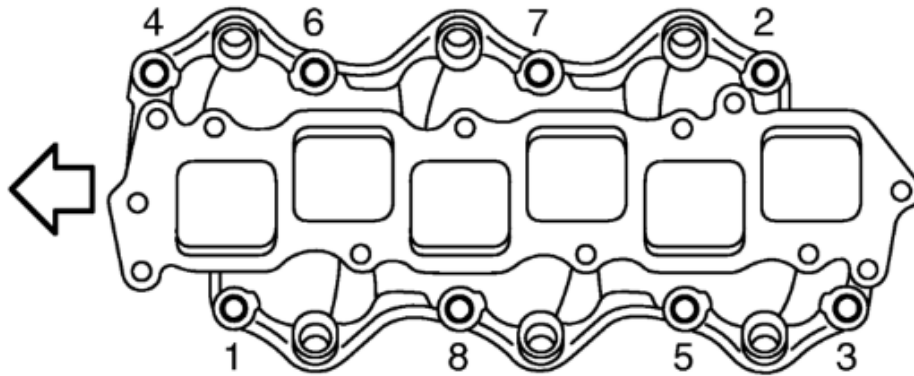


*Figure 60*

25. Install the straight fitting on the 21136-M line into the side port of the Z1 Regulator.
26. Install the 90° fitting on the 21136-L line onto bottom side of the Z1 Regulator and route towards the factory feed line on the passenger side frame rail. You can now return to *Page 32* if you need to mount the Z1 Regulator to the firewall.
27. Connect the straight fitting on the 21136-L line to the quick disconnect AN adapter fitting on the factory feed line that was installed in *Step 4*.
28. Make sure all connection points are tight.



29. Reinstall lower intake plenum if it was removed. Follow *Figure 61* below for proper torque pattern. First torque to 5ft-lbs, then 19ft-lbs.



*Figure 61*

30. Go back inside the vehicle and thread the new Z1 AN feed line onto the adapter fitting on the pump side of the Z1 Top Hat.

31. Connect the OE hard fuel line (what used to be the stock feed line) to the return side of the Z1 top hat.  
*Figure 62.*



*Figure 62*

32. Reinstall the protection panel on the underside that was removed in *Step 1*. You will need to remove the bolt holding the fuel filter in place, sandwich the fuel filter brackets, then reinstall the bolt.

33. Reinstall all other components removed in the previous steps (intakes, cowl panel, trim pieces, etc.).

34. Check the vehicle for loose tools/items.

35. Reconnect the negative battery cable.
36. Prime the fuel system by turning the key to the **ON** position, but do not start the vehicle.
37. Check the fuel pressure gauge to see if you have fuel pressure and check for leaks. This may take several priming sequences for pressure to build up.
38. Start vehicle.
39. Check for leaks again.
40. Quickly monitor the fuel pressure gauge and adjust the Z1 Regulator to the desired fuel pressure. Rotating the adjustment screw clockwise will increase pressure, while rotating it counterclockwise will decrease pressure. Most OEM Nissan fuel systems are set to 52 PSI. The Z1 Regulator can adjust pressure from 40-75psi.
41. Once you confirm the base fuel pressure is correct, tighten the jam nut on the adjustment screw.

**END**

**Additional Technial Support:**

Contact Z1 Motorsports at [info@z1motorsports.com](mailto:info@z1motorsports.com)

Or call 770-838-7777 between 9am and 6pm ET