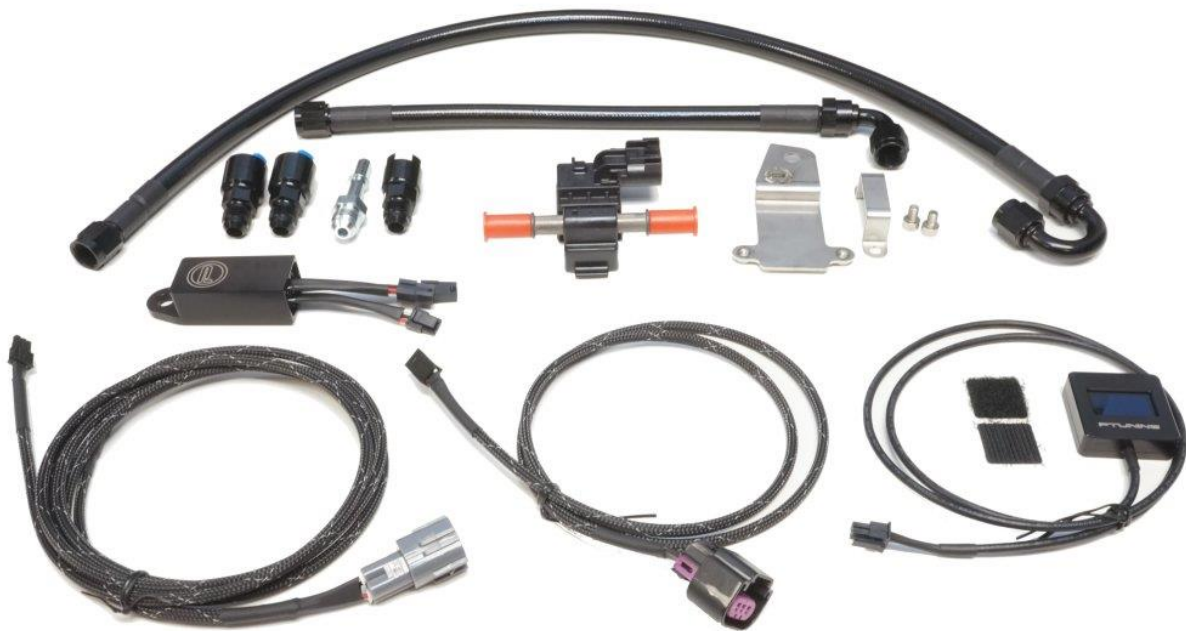# INSTALLATION MANUAL

PTUNING FR-S/BRZ PnP Flex Fuel Kit V2.2 w/ Sensor FailSafe, Bluetooth 4.0 and Optional OLED Display

2013+ Scion FR-S | Subaru BRZ | Toyota 86

Part#: PTP-ENG-90080-V2.2

READ THIS FIRST: Please read the entire installation manual before proceeding. Engine damage may occur if any component within these instructions is improperly installed. This installation should only be performed by a trained specialist who is familiar with the automobile's mechanical & electrical system. Performance Tuning, Inc. (PTUNING) or any of its distributors cannot be held responsible for damages as a result of negligent or improper installation. This flex fuel system can be installed using common tools and automotive procedures. If in doubt, please contact PTUNING's technical support staff at 703-257-1728, between the hours of 9:00AM and 5:00PM EST, Monday through Friday.

All kit components are thoroughly inspected and carefully packaged prior to shipment from the factory. If any shipping damage is evident, contact your supplier and request that they process a claim with the shipper involved. Be sure to review the parts list on page three to verify that you have all necessary system components to proceed. If any components in the parts list are missing, contact PTUNING's customer service staff.

The information contained in this publication was accurate and in effect at the time the publication was approved for printing and is subject to change without notice or liability. PTUNING reserves the right to revise the information presented herein or to discontinue the production of parts described at any time.

SAFETY REQUIREMENTS: It is recommended to follow these precautions.
- Always wear safety glasses & gloves.
- Turn the ignition switch to the OFF position & disconnect the battery.
- Always use properly rated jack stands when working under the vehicle.
- Prevent unexpected vehicle movement by using wheel chocks and/or parking brake.
- Operate the vehicle only in well ventilated areas.
- Do not smoke or use flammable items near or around the vehicle's fuel system.
- Keep hands, clothing and other objects away from moving parts when engine is running.

SUPPLIES: It is recommended to have the following items before beginning installation.
- Scion FR-S, Subaru BRZ, or Toyota 86 factory service manual, for your model year vehicle.
- A large table or bench, and plenty of adjacent available workspace.
- Standard selection of automotive tools, primarily metric sizes.
- Standard electrical wire crimper.

TORQUE RECOMMENDATION: When removing and re-installing factory fasteners, refer to the Scion or Subaru service manual for torque values.

FLEX FUEL SYSTEM PARTS LIST (Included with Part# PTP-ENG-90080):

PACKAGE PART #:	PART #:	Qty/Kit	DESCRIPTION
PKG-PTP-ENG-90080-1A	PTP-ADP-90301-A	1	PTUNING Flex Fuel Sensor Mounting Bracket (304SS)
	PTP-ADP-90301-B	1	PTUNING Flex Fuel Sensor Mounting Clamp (304SS)
	PTP-FAS-90044-08	2	M5-0.8 x 8mm Socket Head Cap Screw (18-8 Stainless Steel)
PKG-PTP-ENG-90080-2	PTP-ELE-90080-SM	1	GM/Continental Flex Fuel Sensor (3/8" Quick-Connect Ends) (Small)
PKG-PTP-ENG-90080-3	PTP-FTG-90080-38F	2	3/8" to -6AN Quick-Connect Aluminum Fitting (Female, Black) (To GM Sensor)
PKG-PTP-ENG-90080-4	PTP-FTG-90080-516F	1	5/16" to -6AN Quick-Connect Aluminum Fitting (Female, Black) (To Factory Fuel Hard Line)
	PTP-FTG-90080-516M	1	5/16" to -6AN Quick-Connect Steel Fitting (Male, Silver) (To Factory Quick Connect Fuel Line)
	PTP-MSC-90013	1	5/16" (8mm) Fuel Line Disconnect Tool (Plastic, Gray)
PKG-PTP-ENG-90080-5	PTP-HSE-90090-25	1	-6AN x 25" E85-Compatible PTFE SS Braided Line #1 (-6AN 180 Degree x -6AN Straight)
	PTP-HSE-90090-10	1	-6AN x 10" E85-Compatible PTFE SS Braided Line #2 (-6AN 90 Degree x -6AN Straight)
PKG-PTP-ENG-90080-6B	PTP-ELE-90081-V2.2	1	PTUNING Flex Fuel Analyzer Module V2.2 w/Sensor FailSafe & BLE 4.0
PKG-PTP-ENG-90080-7	PTP-FAS-90011	4	1/8" x 7.5" Nylon Cable Tie (Black)
	PTP-MAN-90080-V2	1	PTUNING FR-S/BRZ Flex Fuel Kit V2 Installation Manual Download Instruction (2013+ FR-S/BRZ/86)
	PTDECALCOMP_LE_WHI	2	PTUNING (8.5" x 1.5" - Window Decal) - WHITE
	PTP-FAS-90032	1	M8 x 1.25 Flanged Nut Serrated (Zinc-plated)
PKG-PTP-ENG-90080-8A	PTP-ELE-90082-36	1	PTUNING PnP Ethanol Sensor Harness (36")
PKG-PTP-ENG-90080-9A	PTP-ELE-90083-72	1	PTUNING PnP Secondary O2 Sensor Harness (72")
PKG-PTP-ENG-90080-8 (Optional)	PTP-ELE-90081-OLED	1	PTUNING OLED Display w/ Billet Aluminum Bezel and 4-pin 36" PnP Harness
	PTP-FAS-90161	1	7/8" x 7/8" Double-Stick Velcro (Black)
	PTP-FAS-90011	2	1/8" x 7.5" Nylon Cable Tie (Black)

PKG-PTP-ENG-90080-1
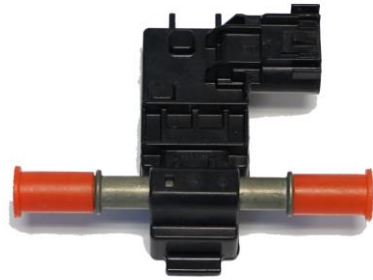
PKG-PTP-ENG-90080-2

PKG-PTP-ENG-90080-3

PKG-PTP-ENG-90080-4

PKG-PTP-ENG-90080-5

PKG-PTP-ENG-90080-6B

PKG-PTP-ENG-90080-7

PKG-PTP-ENG-90080-8A

PKG-PTP-ENG-90080-9A

PKG-PTP-ENG-90080-8 (Optional)

1 – FUEL LINE INSTALLATION

1. With the vehicle's engine turned off, remove the green 20amp fuel pump fuse located in the main fuse box in the engine bay. The fuse is labeled F/PMP on the underside of the fuse box cover. See FIGURE 1.1 & 1.2
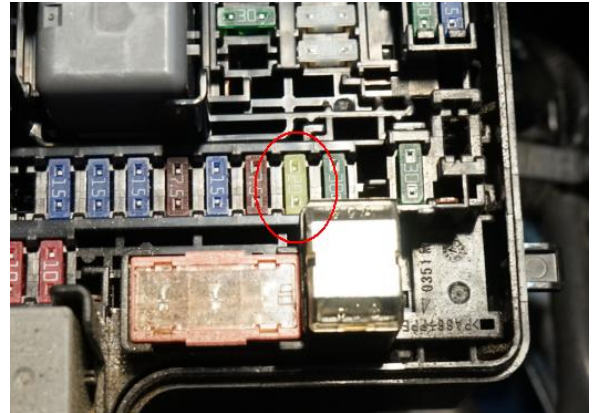
FIGURE 1.1
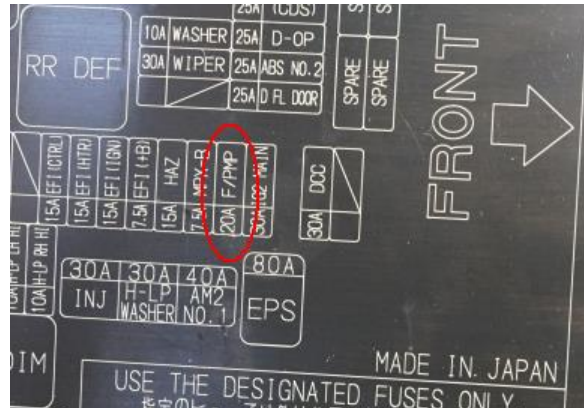
FIGURE 1.2

2. With the fuel pump fuse removed, start the vehicle to relieve the pressure in the fuel line. The vehicle should either refuse to start or idle momentarily and then shut off. At this point, most of the fuel in the fuel lines should be evacuated. Reinstall the 20amp fuse back into its original location.

3. Disconnect the negative and positive battery terminals.

4. Layout all the installation packages on a workbench and verify that you have received all the packages listed at the beginning of this manual. Some packages are marked as optional and may not be included with your kit. The instructions will refer to the individual packages throughout the manual.

5. Locate package PKG-PTP-ENG-90080-1 & PKG-PTP-ENG-90080-2. Install the flex fuel sensor onto the mounting bracket using the two supplied M5 socket-head cap screw. See FIGURE 1.3

6. Using a wrench, remove the mounting nut for the brake booster. See FIGURE 1.4

FIGURE 1.3

FIGURE 1.4

7. Install the flex fuel sensor assembly onto the brake booster (figure 1.4). You can disconnect the brake fluid level sensor to make room. For now, leave the bolt loose to allow it to rotate slightly during the installation before it is secured. See FIGURE 1.5

FIGURE 1.5

8. Find the direct injector fuel feed line. See FIGURE 1.6
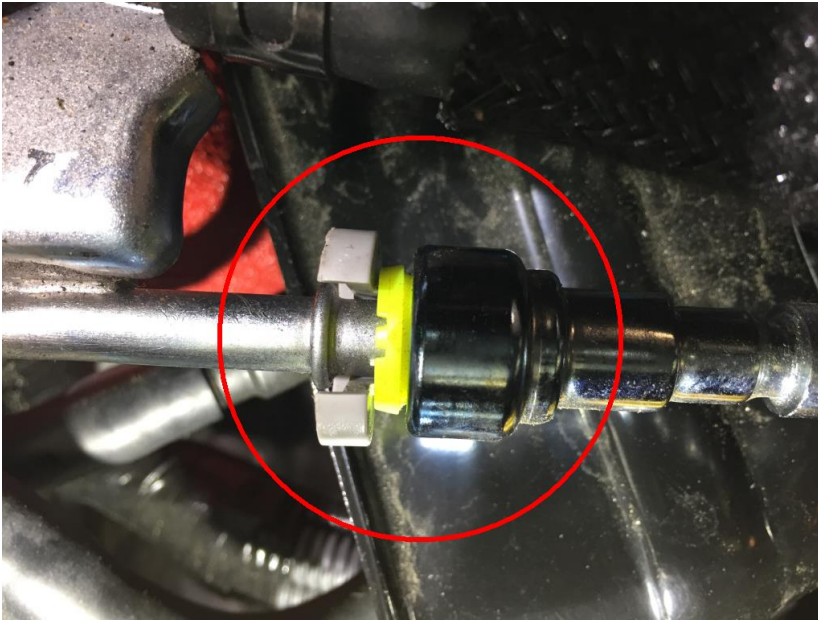
FIGURE 1.6

9. Using the supplied gray plastic 5/16" disconnect tool from package PKG-PTP-ENG-90080-4, carefully disconnect the fuel line by sliding the tool over the hard line and working the tool into the yellow disconnect sleeve. See FIGURE 1.7 & 1.8
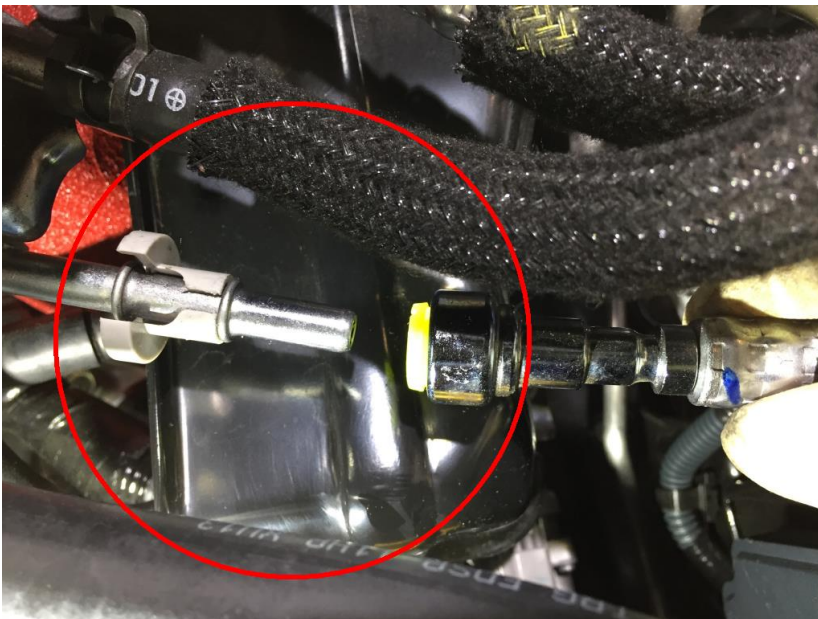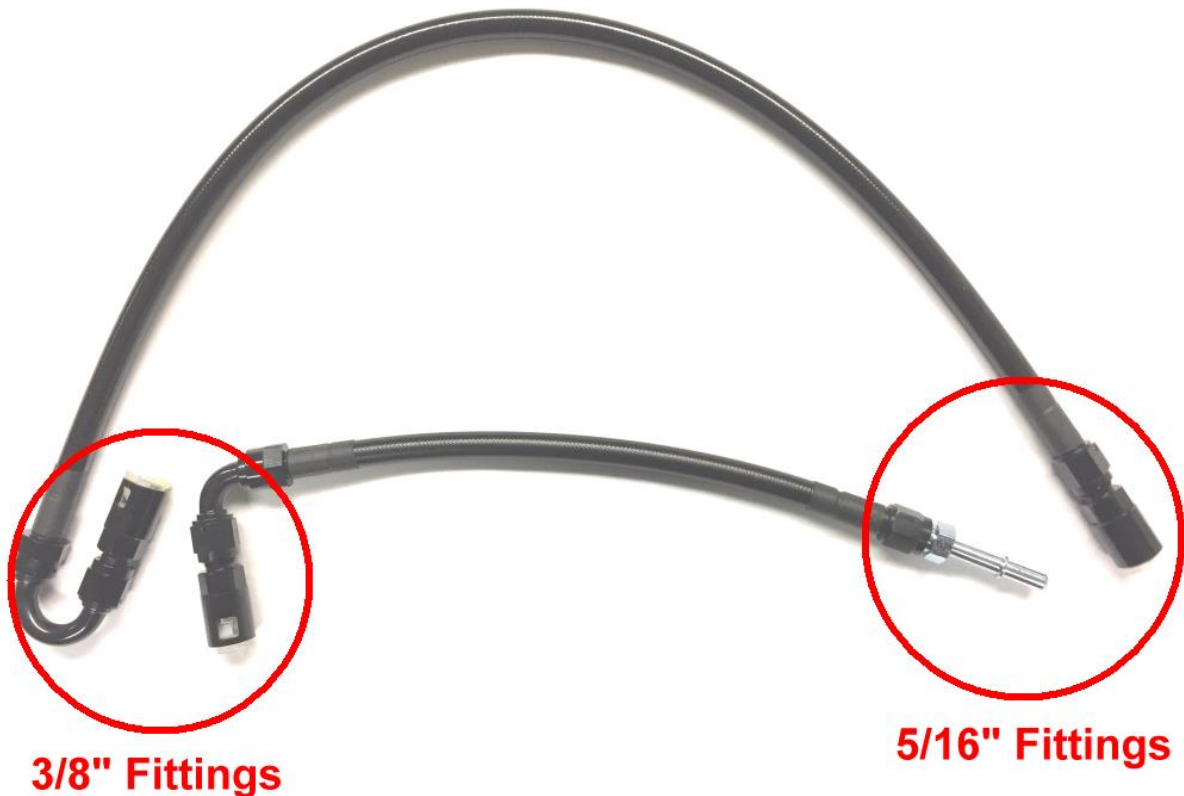
FIGURE 1.7

FIGURE 1.8

10. With the tool fully inserted, pull the connection and the hose will disconnect. See FIGURE 1.9

FIGURE 1.9

11. At this point, prep the quick disconnect fittings by installing them to the appropriate lines. The fittings are supplied two separated packages. Package PKG-PTP-ENG-90080-3 contains the 3/8" female quick disconnect fittings for connecting to the Continental ethanol sensor. Package PKG-PTP-ENG-90080-4 contains the 5/16" male quick disconnect fitting and 5/16" female threaded cap fitting for connecting to the factory hard line.

12. Locate the two supplied black stainless steel braided fuel lines from package PKG-PTP-ENG-90080-5. Install and torque the fittings as shown below. The 5/16" female threaded cap fitting will go on the straight end of longer fuel line, while the 5/16" male quick connect fitting will go on the straight ends of shorter fuel line. The two remaining 3/8" female quick connect fittings will go on the 90* and 180* ends of the short and long fuel lines, respectively. See FIGURE 1.10

FIGURE 1.10

3/8" Fittings   5/16" Fittings

13. Route and install the short fuel line along the driver-side front strut tower so that the line has ample slack for movement with the engine (reference figure 1.13 for routing). Connect the 5/16" male connector to the factory direct injector feed line that was removed earlier. Connect the 3/8" female quick connect fitting on the 90* end of the short fuel line to the Continental ethanol sensor. Don't click the quick disconnects in place just yet. Simply slide them on partially. See FIGURE 1.11, 1.12
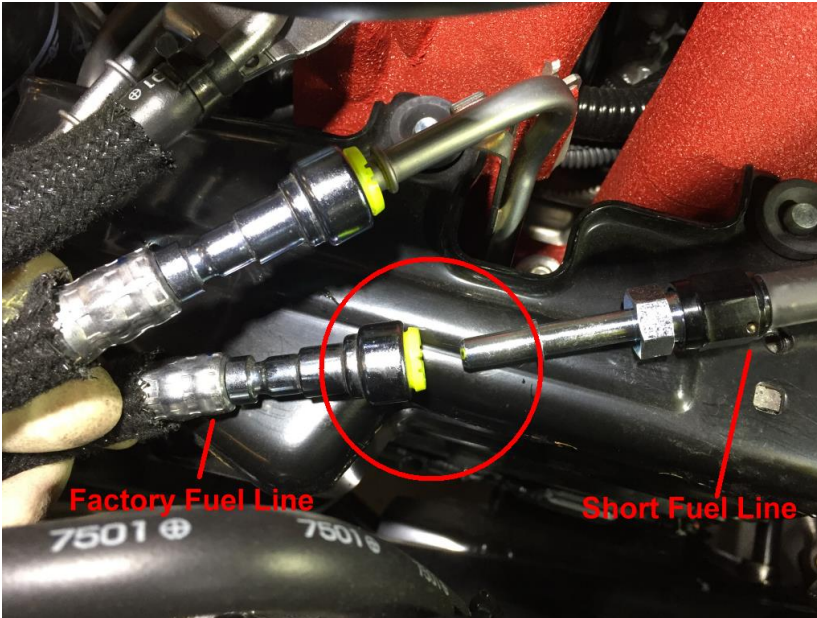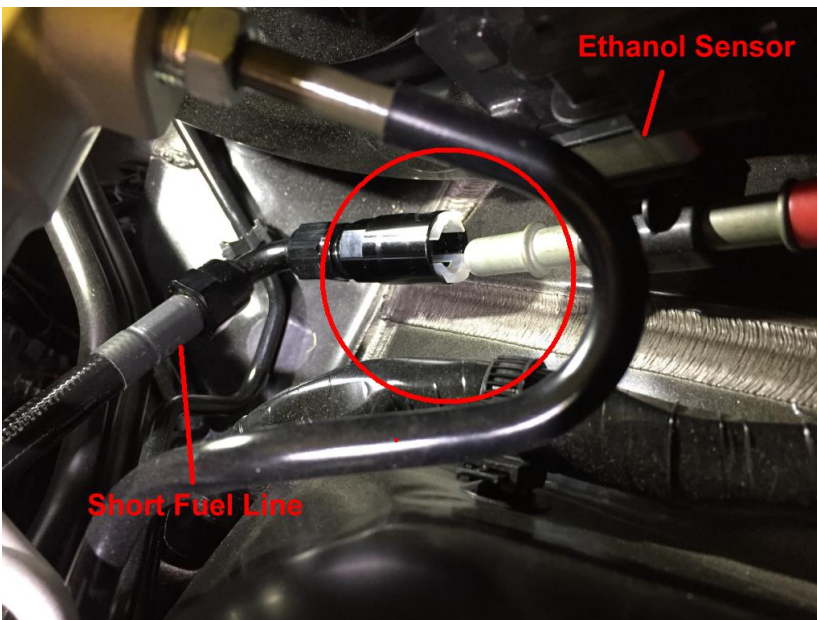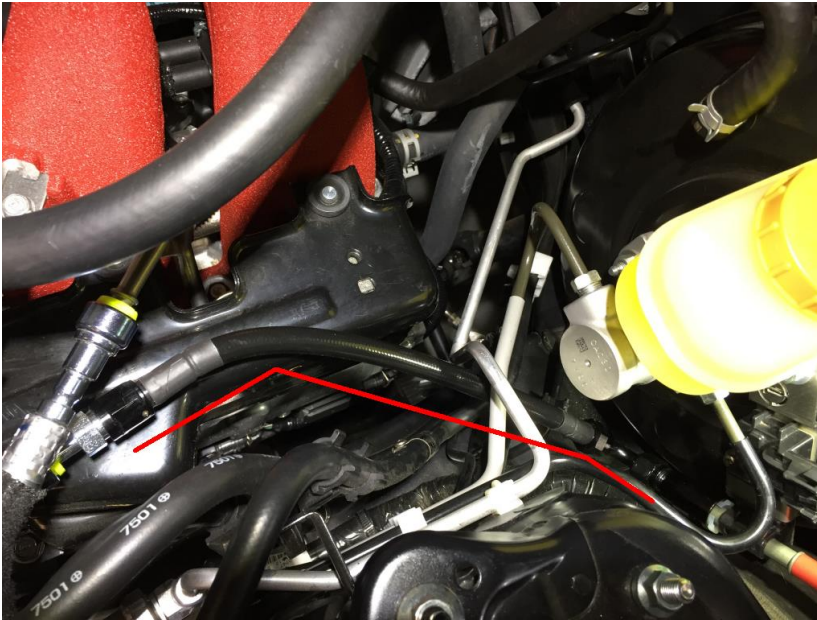
FIGURE 1.11

FIGURE 1.12

FIGURE 1.13 (Short Fuel Line Routing)

14. Route and install the long fuel line next (reference figure 1.18 for routing). Remove the threaded cap from the 5/16" female fitting on the long fuel line. Place the thread cap between the two raised grooves on the direct injection hard line that was removed earlier. Push the 5/16" female fitting onto the factory hard line until the fitting mates with the threaded cap. Hand tighten the fitting to the thread cap until the cap is fully seated against the 5/16" female fitting. Fully tighten the threaded cap to the female fitting by placing the wrench on the flat slot on the thread cap and hex end of the female fitting. See FIGURE 1.14, 1.15 & 1.16
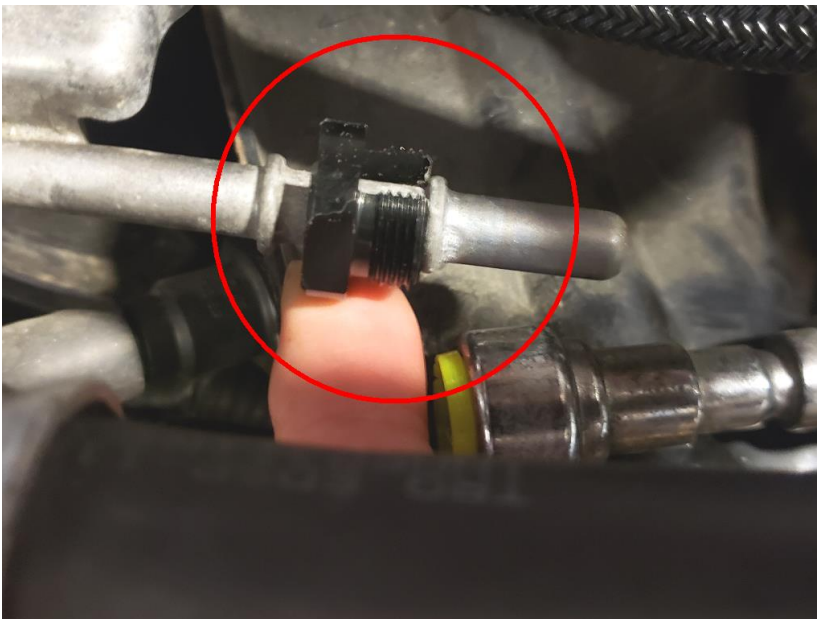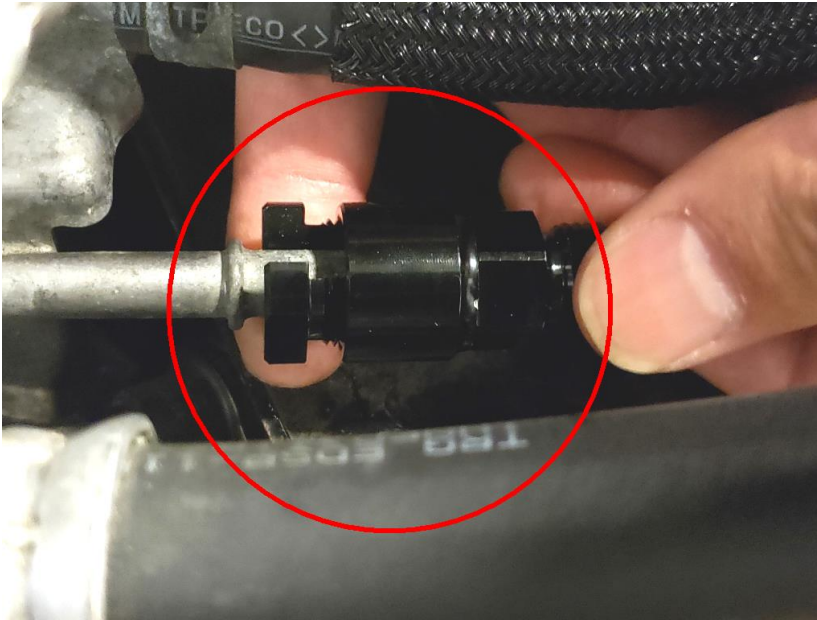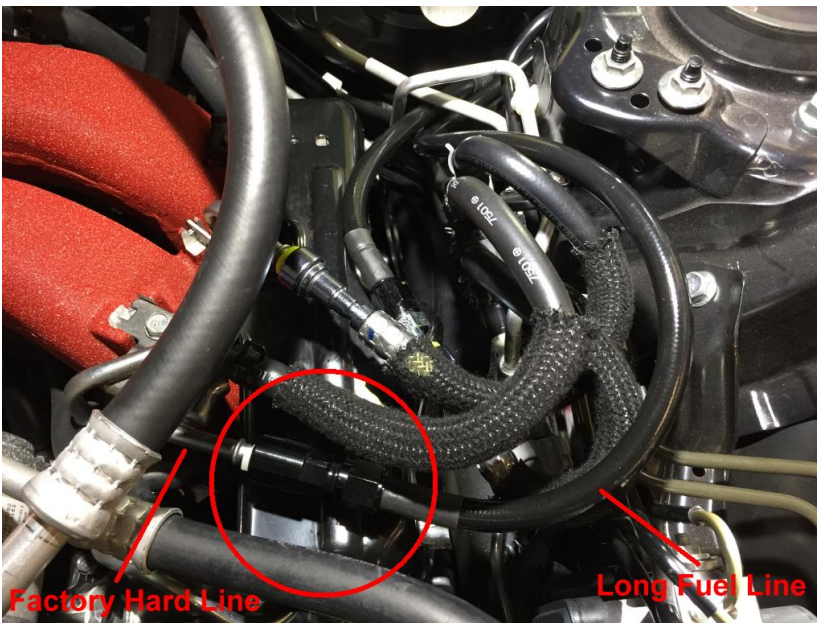
FIGURE 1.14

FIGURE 1.15

FIGURE 1.16

Factory Hard Line

Long Fuel Line

15. Connect the 3/8" female quick connect fitting on the 180* end of the long fuel line to the other end of the Continental ethanol sensor. See FIGURE 1.17
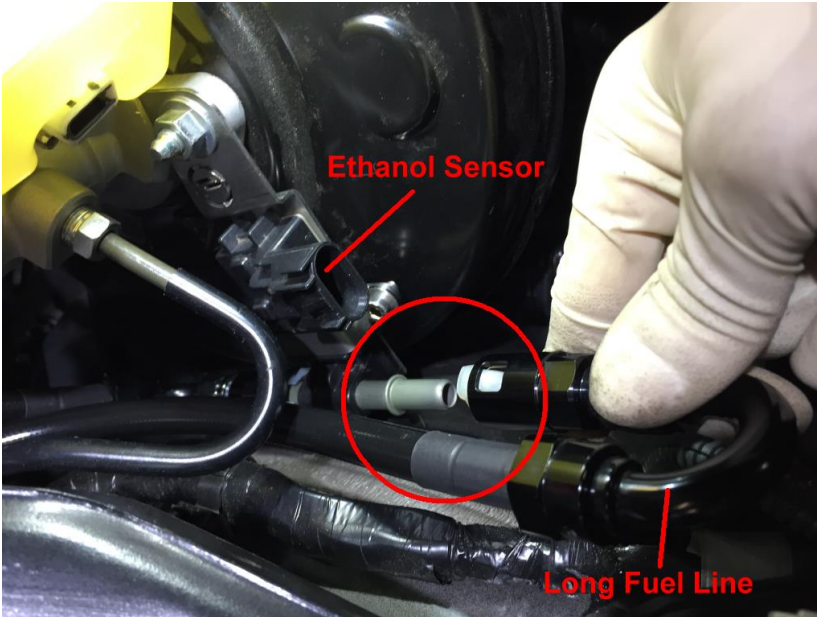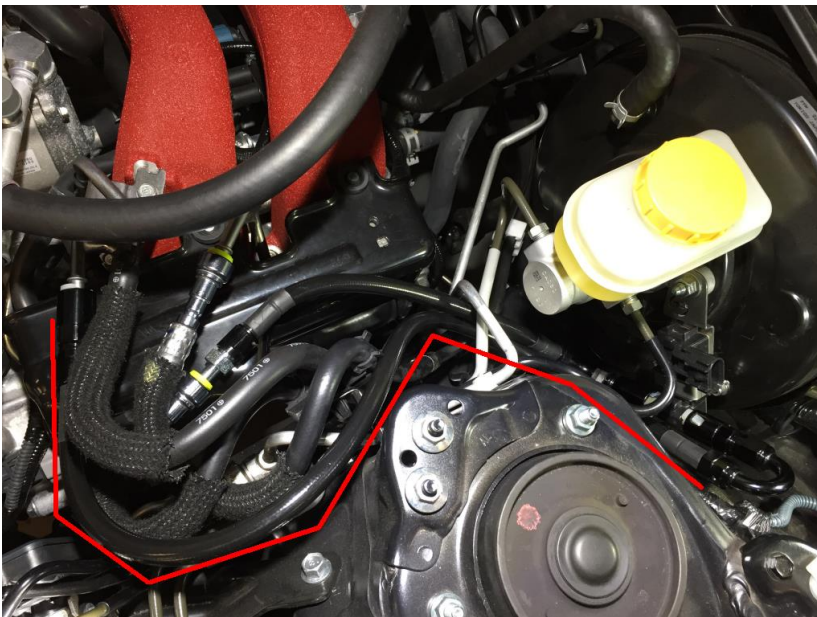
FIGURE 1.17

FIGURE 1.18 (Long Fuel Line Routing)

16. Check the short and long fuel lines and make sure they don't pinch or snag on anything. Once done, snap all three quick disconnect fittings into place. There will be an audible click when fully inserted. Tug on the lines afterwards as a double check to make sure they're secure. Finally, torque the nut on the ethanol sensor bracket. If you removed the brake fluid level sensor plug, don't forget to reconnect it.

2 – WIRING (INSIDE THE ENGINE BAY)

1. Using the supplied secondary O2 sensor harness from package PKG-PTP-ENG-90080-8A, route the harness from the secondary O2 sensor plug to the firewall grommet as shown below. Secure the O2 sensor harness to the factory harness loop with the supplied cable ties. See FIGURE 2.1
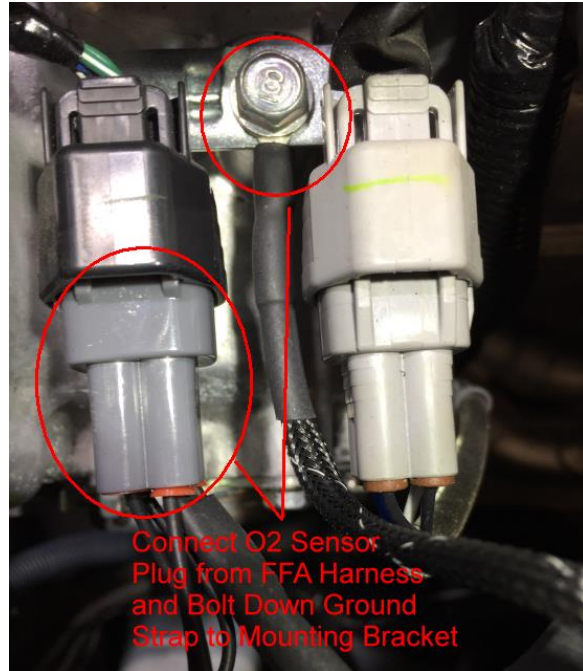
FIGURE 2.1
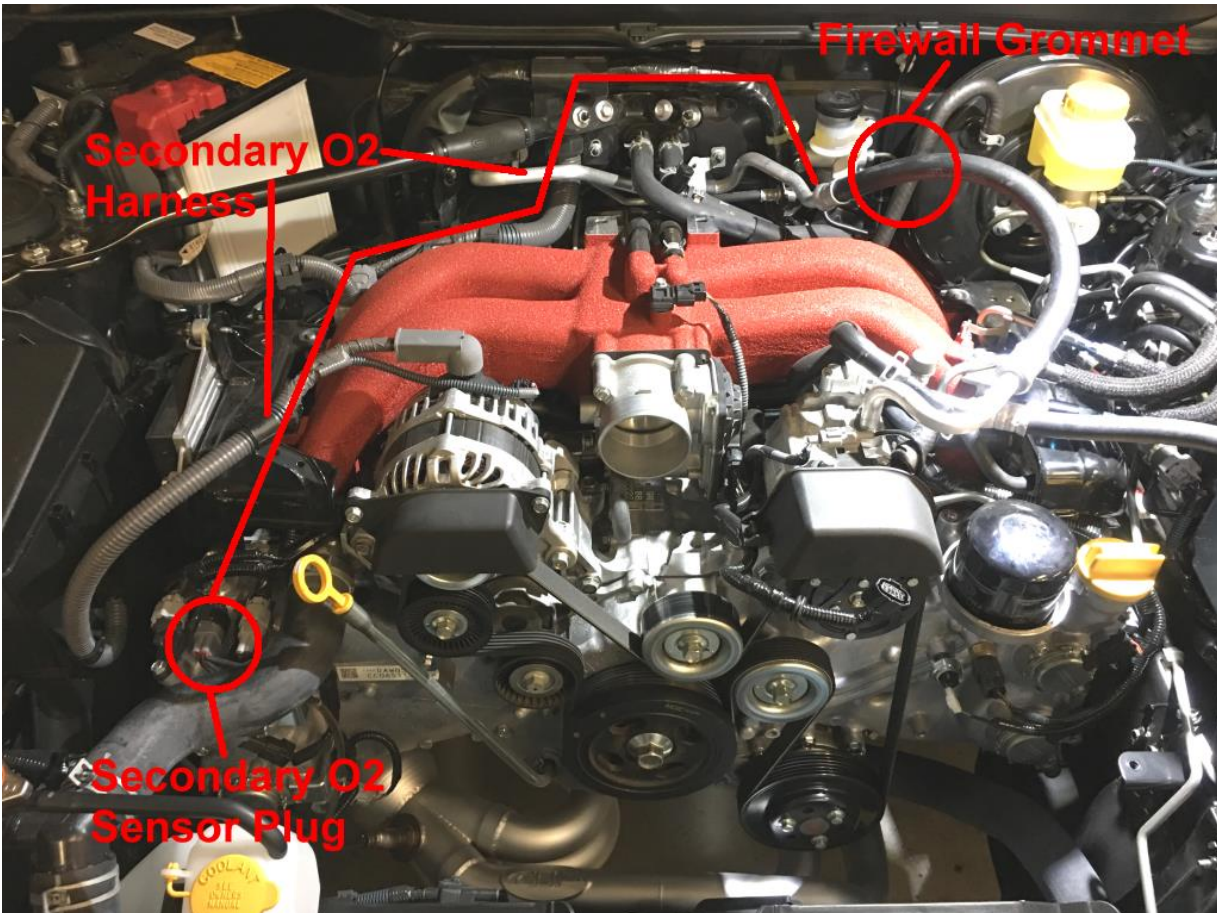
2. Locate and disconnect the black male factory secondary O2 sensor plug from the top front of the passenger side of the engine and secure the original factory O2 sensor plug with the supplied cable tie (Zip tie) to prevent damage to it—the secondary O2 sensor will no longer be active. Connect the gray male 4-pin factory-style secondary O2 sensor plug from the supplied harness to the black female secondary O2 sensor plug mounted on the engine—You will hear a click when the plug is fully inserted. Bolt down the O2 Sensor Plug's ground strap to the M6 bolt on the O2 sensor mounting bracket. Note: your ecu tuner will need to provision the ecu to use the secondary O2 sensor input for the flex fuel map. See FIGURE 2.2 & 2.3.

FIGURE 2.2

Disconnect Secondary
O2 Sensor Plug and
secure original plug
with ziptie

FIGURE 2.3

Connect O2 Sensor
Plug from FFA Harness
and Bolt Down Ground
Strap to Mounting Bracket

3. Using the supplied ethanol sensor harness from package PKG-PTP-ENG-90080-9A, route the harness behind the driver-side vacuum brake booster to the firewall grommet. Plug the black ethanol sensor plug into the Continental ethanol sensor—you will hear a click when the plug is fully seated on the ethanol sensor receptacle. The other end of the harness with the micro 3-wire plug will be routed through the firewall grommet in the steps to follow.

4. Between the brake booster and the clutch master cylinder, there is a plugged grommet in the firewall. Remove the grommet. See FIGURE 2.4 & 2.5

FIGURE 2.4

FIGURE 2.5

5. Using a box cutter, cut a cross hatch through the center of the grommet large enough to pass the two 3-pin micro plugs from the secondary O2 harness and ethanol sensor harness through the grommet. Finally, feed the two micro plug and harness through the slotted hole--one plug at a time. From inside the vehicle, underneath the dashboard, pull the two micro plug and harnesses approximately 1 foot beyond the firewall grommet opening. The harnesses will pass through the firewall right above the gas pedal assembly. See FIGURE 2.6 & 2.7

FIGURE 2.6

FIGURE 2.7

6. Locate the Flex Fuel Analyzer (FFA) Module from package PKG-PTP-ENG-90080-6B. Connect the female micro 3-pin plug from the secondary O2 sensor harness to the male micro 3-pin plug on the FFA module. Connect the male micro 3-pin plug from the ethanol sensor harness to the female micro 3-pin plug on the FFA module. The third 4-pin male plug on the FFA module is used for the optional OLED display. See FIGURE 2.8

FIGURE 2.8

Secondary O2 Sensor Plug

OLED Display Plug (Optional)

Ethanol Sensor Plug
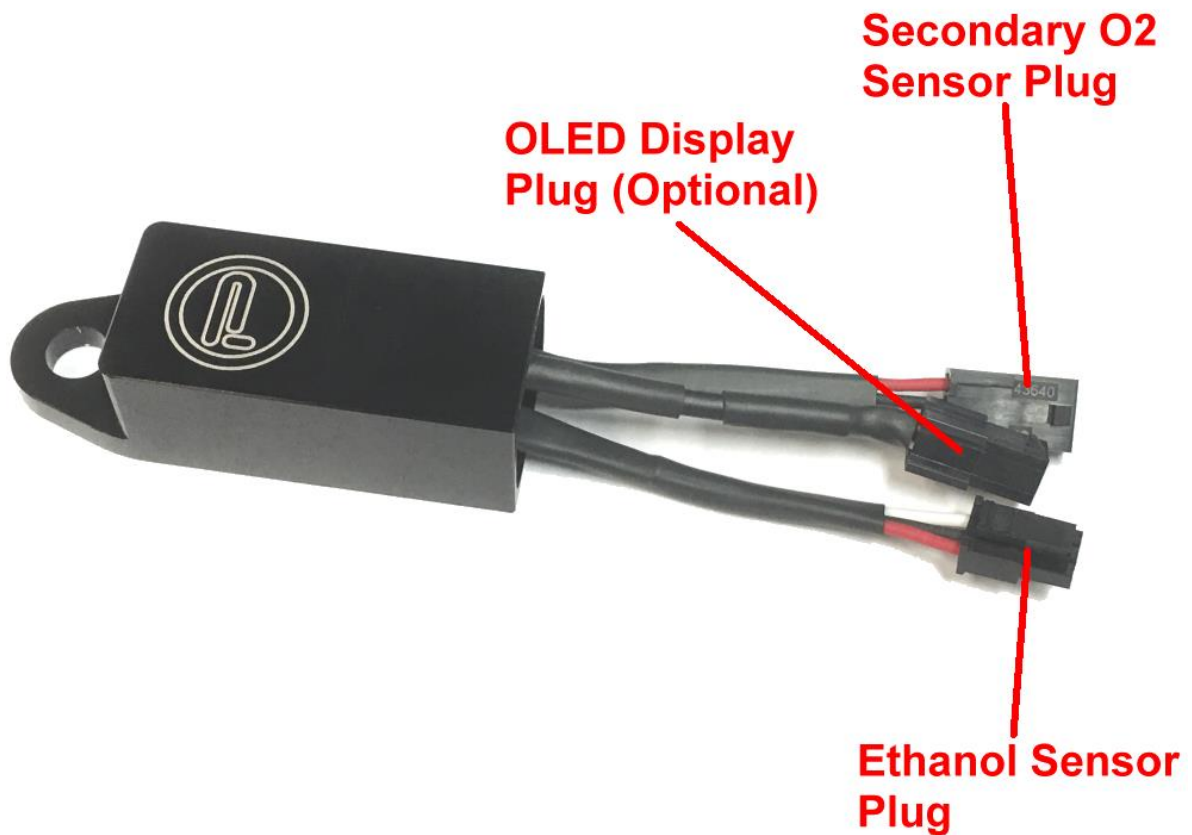
7. Route the connected harnesses and FFA module above the steering wheel rack, towards the brake master cylinder assembly. Using the supplied M8 hex flange nut from package PKG-PTP-ENG-90080-7, secure the FFA module onto the M8 stud located on the top right-hand side of the master cylinder assembly housing. Make sure the harnesses from the FFA module does not interfere with the movement of the steering rack or gas pedal assembly. At this time, slowly pull the two harnesses that was feed through the firewall grommet back into the engine bay to remove excess slack between the firewall grommet and the FFA module. Reinstall the firewall grommet into the firewall grommet opening. See FIGURE 2.6, 2.9 & 2.10

FIGURE 2.9

FIGURE 2.10

3 – Optional OLED Display (INSIDE THE CABIN)

Since many customers will have things such as aftermarket gauges, stereo systems, etc., many under dash layouts may be different. As such this section is meant to detail how PTUNING feels is the best or easiest way to route the OLED harness in a stock vehicle. The key thing is that the harness is routed in a way to prevent it from snagging on moving parts such as the pedals, people's feet, etc.

1. The OLED harness from the FFA module should now be easily found inside the cabin. Following the harness, you'll find it comes through just below the clutch pedal crossover shaft by the gas pedal. Route the harness above the clutch pedal crossover shaft and over towards the center console. Secure the harness with the supplied cable tie. Routing it as such prevents the harness from catching on the gas pedal.

2. At this time, you can connect the 4-pin male micro plug from the FFA harness to the female plug on the OLED display and proceed to mount the display either around the driver-side dash board using the supplied sticky back Velcro. Secure any loose harness with cable ties. See FIGURE 3.1 & 3.2

FIGURE 3.1

FIGURE 3.2

4 – Final Check

1. At this point, we're going to check everything over. Reconnect the negative and positive battery terminals. Turn the key on but do not start the engine. This is to let the fuel pump prime. Inspect the flex fuel hoses for any leaks. Start the engine and again inspect the car for leaks. If you have the optional OLED display, verify that the display comes on and you should see the ethanol content reading. The reading should be anywhere from 7%-11% content for U.S. pump gas. You may see a check engine light (CEL) for disconnected secondary O2 sensor since the circuit is now used for the flex fuel analyzer analog output.

2. Download and install the **PTUNING Flex** android app from the Google Play Store. Launch the app and select your FFA module (i.e. PTFFA-#####) to pair with your phone/device. You should see an "Access Denied" message. Follow the steps to authorize your device with the FFA module. The authorize procedure will instruct you to disconnect and reconnect the flex fuel sensor plug on the GM/Continental ethanol sensor. Once your phone/device is authorized, you will see the gauge on the app with the ethanol content reading. See FIGURE 4.1 & 4.2

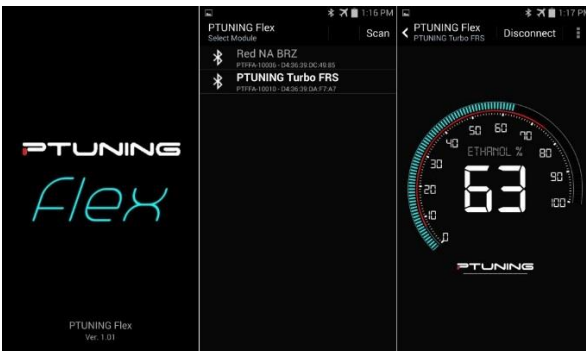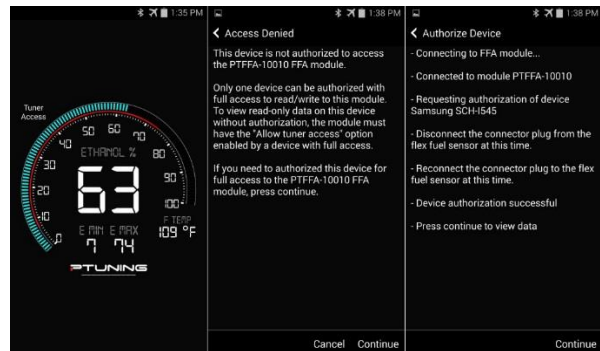FIGURE 4.1   FIGURE 4.2

3. You can now load your map or schedule a dyno tune with your local tuner!