

# PERRIN

## Top Feed Fuel Rail Tuner Kit For 2002+ WRX/STI with EJ Motor

2018-04-18

PSP-FUL-220

Thank you for purchasing this PERRIN product for your car! Installation of this product should only be performed by persons experienced with installation of aftermarket performance parts and proper operation of high performance vehicles. If vehicle needs to be raised off the ground for installation, the installer must use proper jacks, jack-stands and/or a professional vehicle hoist for safety of the installer and to protect property. If the vehicle is lifted improperly, serious injury or death may occur! Please read through all instructions before performing any portion of installation.

### GENERAL MODIFICATION NOTE

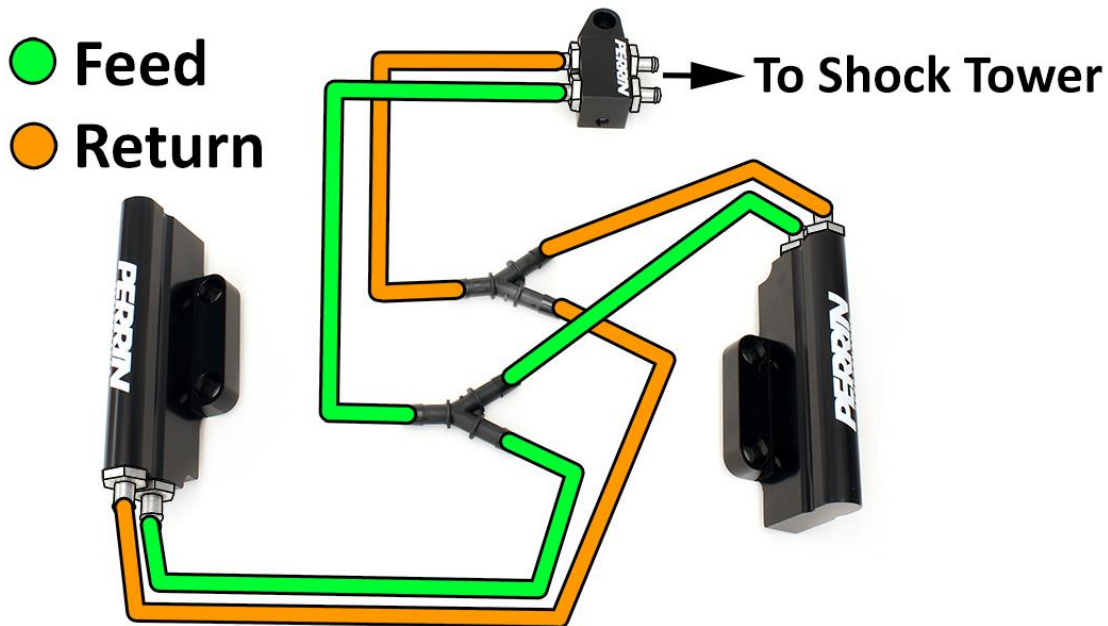
Modifications to any vehicle can change the handling and performance. As with any vehicle extreme care must be used to prevent loss of control or roll-over during sharp turns or abrupt maneuvers. Always wear seat belts, and drive safely, recognizing that reduced speeds and specialized driving techniques may be required. Failure to drive a vehicle safely may result in serious injury or death. Do not drive a vehicle unless you are familiar with its unique handling characteristics and are confident of your ability to maintain control under all driving conditions. Some modifications (and combinations of modifications) are not recommended and may not be permitted in your state or country. Consult the owner's manual, service manual, instructions accompanying these products, and local laws before purchasing and installing these modifications. You are responsible for the legality and safety of the vehicle you modify using these components.

### SPECIAL NOTES:

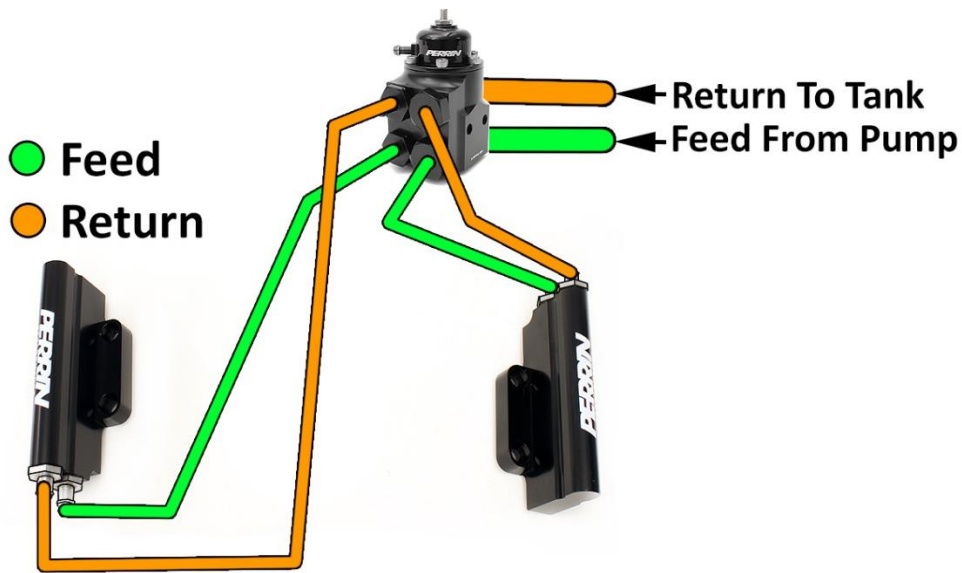
- This fuel rail kit requires that the installer be very familiar with Subaru fuel systems and that many precautions are made to ensure fuel lines do not fail or rub on components that can lead to a fuel leak.
- All fittings and lines must be purchased separately. Make sure to use fittings, O-rings and fuel lines that are designed for fuel injection systems. Do not use fuel lines that don't specifically say they are approved for fuel injection systems. These hoses will fail and will cause a fire
- No fittings are included with this kit. Follow the manufacturer's instructions as to how to connect hoses to fittings and how tight to tighten them.
- There is no fuel pressure regulator included with this kit.
  - A PERRIN Junction Block that allows the use of an OEM regulator can be purchased to make installation easier (see dealer for more info).
  - An aftermarket regulator (like our PERRIN Regulator specifically designed for Subarus) can be purchased.
  - If installing on a 2008+ STI model, the OEM regulator can be installed without purchasing any additional hardware as it is mounted on the shock tower.
- Fuel rails are threaded for a typical -6 male type O-ring fitting. The female thread pitch of our fuel rail is 9/16-18 with an O-ring groove built in. This is important to understand to make sure the correct type of fittings are purchased.
- Installing these fuel rails will increase the amount of fuel being delivered and having the car re-tuned is highly recommended.
- Assumptions have been made that the intake manifold and fuel rails have already been removed.

### Parts Included With PERRIN Fuel Rail Kit

- (2) PERRIN Fuel Rail (same left or right)
- (4) M8x20mm SS Socket Head Bolt



Typical fuel rail hose routing using "Tee's" and "Y's" to join left and right side together

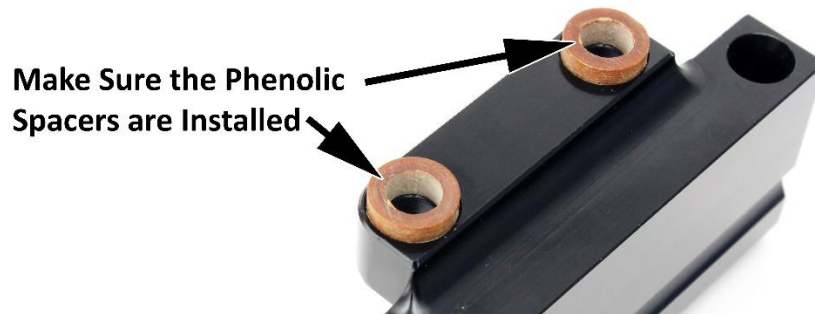


Recommended fuel rail hose routing using PERRIN Fuel Pressure Regulator.

### Setting Up PERRIN Rail and Hose Routing

Routing will vary greatly from install to install. Things like OEM intercoolers, aftermarket top mount intercoolers, front mount intercoolers, blow off valves, and other intake manifold modifications will affect how hoses will be routed. There is no perfect way to route them, and great caution must be taken when planning fuel hose routing. Be prepared to set intake manifold on engine and remove it a few times while routing hoses.

1. Install +fittings into rails making sure to use proper Viton (the material) O-rings and a small bit of grease on threads and O-ring.
2. Using supplied M8 socket cap screws, loosely install fuel rails to intake manifold making sure phenolic spacers are between manifold and rail. **Note: You may leave fuel injectors out of rails at this time as you may need to remove rails a few times during the planning and installation stages.**



3. Set manifold onto engine and prepare to route fuel lines. Make sure to loosely install coolant fill tank as this can change the hose routing.



4. Feed fittings on fuel rail:
  - a. If typical install (use diagram above) is being done, connect and route hoses from each of the feed fittings to a central location where a "Tee" or "Y" will go. Connect third leg of "Tee" or "Y" to the feed from the fuel pump (This is the pressurized line coming from the fuel pump to the engine bay).

- b. If PERRIN Fuel Pressure Regulator is being installed, run each hose from the feed on the rail to one of the ports marked feed on the fuel pressure regulator. There is no need for a “Tee” or “Y” when using the PERRIN Fuel Pressure Regulator.
5. Return fittings on fuel rail:
    - a. If typical install (use diagram above) is being done, connect and route hoses from each of the return fittings to a central location where a “Tee” or “Y” will go. Connect third leg of “Tee” or “Y” to the correct side (typically marked return) of a fuel pressure regulator.
    - b. If PERRIN Fuel Pressure Regulator is being installed, run each hose from the return on the rail to one of the ports marked return on the fuel pressure regulator. There is no need for a “Tee” or “Y” when using the PERRIN Fuel Pressure Regulator.



## Injector Installation

1. Remove intake manifold from car and unbolt fuel rails from manifold. Place a small amount of grease inside of each injector port and around each O-ring of injector. This will help keep injector O-rings from getting cut during installation. **Note: Best type of grease to use is lithium, but any type of lighter grease will work.**
2. Install injectors into fuel rails making sure to twist slowly and wiggle them slowly as you press them into each port. This will reduce the chance of an O-ring getting cut.
3. Check that each port on intake manifold has a small rubber seal in the bottom of it. **Note: This is a very important seal that needs be installed. These seals sometimes fall out or get stuck to each injector as they are removed. Do not proceed without checking for these being installed.**
4. Bolt rails to manifold making sure that all injectors line up with ports on intake manifold before tightening down.
5. Rotate injectors so they face the same direction as stock fuel rails aligned them. Injectors should be turned so the plugs face in opposite directions (facing front and back of car). **NOTE: Some aftermarket injectors may need small tabs trimmed from plug. Also, many aftermarket injectors are taller and require spacers under the rail. These are supplied by the injector manufacture not by PERRIN Performance.**
6. Reinstall intake manifold per factory service manual.

## Fuel Pressure Regulator Installation

- This step can vary greatly depending on which fuel pressure regulator being installed. What is most important is that you follow the manufacture’s recommendations of how to install the fuel pressure regulator.
- If installing our rails to a PERRIN Junction Block, follow the instructions that came with them.
- Be familiar with adjusting the fuel pressure regulator before starting the car. This may involve disconnecting the vacuum source for the regulator, or a special procedure specific to the manufacturer. Subaru fuel systems were setup to run 43.5PSI base fuel pressure without any vacuum source hooked up to the regulator.
- Base fuel pressure is measured with fuel pump running 100% duty cycle. If fuel pump is running less than 100% duty cycle, the fuel pressure reading will not be accurate. See your tuner to properly adjust the fuel pressure.

## Double Checks Before Starting

- Make sure hoses are all connected properly (feed and returns connected to the correct fuel pump and return hoses).
- Prime the fuel system (turn the key to the on position, then wait a few seconds) at least 5 times. Look closely for fuel leaks around the fuel injectors, and smell for fuel. If there is a leak, you should be able to smell it after system is pressurized. **Note: If leaks are present stop installation. Double check all connections and O-rings for signs of damage. If nothing is found, please contact PERRIN Performance for technical assistance prior to proceeding.**
- If no leaks are found, start engine.

**If vehicle doesn't start or runs poorly, please review the following before seeking technical help:**

1. Are each of the coil wires connected? Are they connected to the correct cylinders? White plugs go to front cylinders. Black plugs connect to rear cylinders.
2. Are all wire harness grounds bolted to intake manifold?
3. Are the crank and cam sensors plugged in, and snug to each sensor?
4. Are each of the injector O-rings (Fuel rail O-ring and manifold O-ring) undamaged and installed?
5. Was each manifold gasket installed undamaged and aligned with intake ports to avoid vacuum leaks?
6. Are the feed and return hoses connected correctly?
7. Re-check each vacuum connection for leaks. Double check inlet hose, PCV etc.

If these check out to be ok, please contact technical support. Have all CEL codes available as this will significantly reduce the time needed to solve any problem you encounter.

