Edelbrock EFI
Return Fuel System W/Rail Mounted Regulator
Part #3651 & 3653

INSTALLATION INSTRUCTIONS

PLEASE study these instructions carefully before beginning the installation. This installation may require drilling and possible welding to the vehicle's fuel tank or sending unit. If you do not feel comfortable performing this installation or have never worked with automotive fuel systems before, it is highly recommended to have the installation completed by a Professional Mechanic. If you have any questions, please call our **Technical Hotline at: 1-800-416-8628**, Monday - Friday, 7:00 am - 5:00 pm, Pacific Standard Time.

WARNING!

DO NOT attempt to modify the fuel tank until all fuel and fuel vapors have been properly removed from the tank. Prior to starting the installation, make sure to eliminate all potential fire hazards as fuel leakage can occur when loosening the fuel system connections and components. Proper installation is the responsibility of the installer. Improper installation will void the manufacturer's warranty and may result in poor performance and engine or vehicle damage.

DESCRIPTION

3651 & 3653 are return style fuel systems designed to work in conjunction with most EFI systems with dash 6 fuel rails. 3651 contains a non-adjustable regulator preset to 43 PSI while 3653 contains a non-adjustable regulator preset to 58 PSI. All major fuel system components are included, except for fuel tank modification materials (*if applicable*).

CAUTION: Due to the high fuel pressure required for an EFI system, the supplied 3/8 inch high pressure rubber fuel line <u>MUST</u> be used as the primary fuel line. If supplying your own high pressure fuel line, a minimum of SAE J30R9 (100PSI) working pressure must be used. Additional fuel fittings will be required.

NOTE: THIS FUEL SYSTEM REQUIRES A MECHANICAL FUEL PUMP BLOCK-OFF PLATE, GASKET, AND BOLTS SPECIFIC FOR YOUR APPLICATION (NOT INCLUDED).

P/N 3651 & 3653 Include:

1. Fuel Pump and Mounting Hardware
2. Regulator with mounting hardware (43 or 58 PSI)
3. Fuel Filter with Mounting Clamps (1)
4. 3/8" High Pressure Twist-Lok Fuel Hose (20')
5. 5/16" Rubber Return Hose (20')
6. Hose Clamps (9)
7. Twist-Lok Fittings (1 - Straight, 2 - 45°, 3 - 90°)
8. -6 AN Bulkhead Fittings (3)
9. Tie Wraps (10)
10. O-Rings (5)

INSTALLATION DIAGRAM

Fig 1

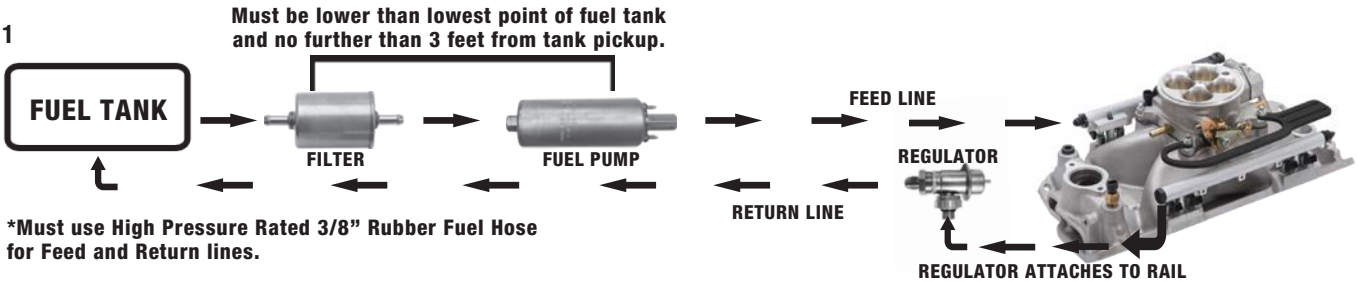


Fig 2

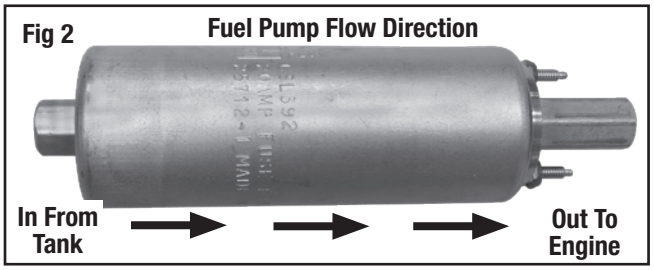
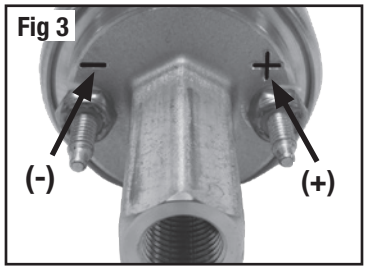


Fig 3



INSTALLATION TIPS AND PROCEDURES

WARNING! ***Make sure to perform the installation in a well ventilated area away from any potential fire hazards. Gasoline fumes are toxic and highly flammable.***

1. Disconnect the NEGATIVE (-) terminal connection on the battery.
2. Release the pressure in the fuel system by removing the gas cap.
3. Remove the fuel lines from the factory mechanical fuel pump and unbolt the fuel pump from the engine. Thoroughly clean the block's mating surface and install a fuel pump block-off plate (*required - not included*) specific for your application. Make sure to use the appropriate fuel pump block-off plate gasket and bolts.

   NOTE*: If using a low pressure electric fuel pump, a fuel pump block-off plate may already be present. All other components of the electric fuel pump must be removed.*
4. Disconnect the factory hard line from the fuel tank sending unit.

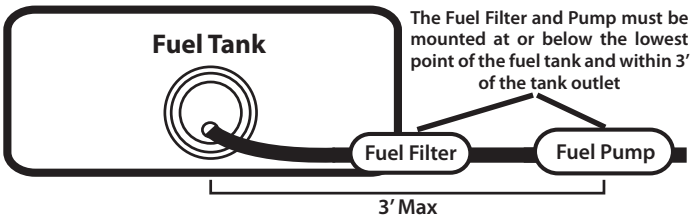
   NOTE*: The factory hard lines can be completely removed if not used as a return line (see Step 5). If not removing or using as a return line, it is recommended to cap the ends of the factory hard line to prevent contamination.*
5. To ensure proper fuel pressure and delivery, a bypass fuel return line inlet must be installed onto the fuel tank sending unit at this time. There are three options for installing a bypass return line:

   NOTE*: If a fuel return line is not present, modifications to the fuel tank are required to route the fuel return line through the sending unit plate back into the tank. The first two methods listed below require welding and should be done by a Professional.*

   Please refer to Page 3 for more details on the three bypass fuel return line methods.

   1. Rubber Return Hose (*Supplied 5/16" Rubber Hose*) or SAE J30R7 (50 PSI) working pressure:
      a. Method 1a - Weld in a 5/16" hard line inlet onto the sending unit cover plate.
      b. Method 1b - Install a -6 AN Bulkhead fitting onto the sending unit cover plate (*does not require welding*).
   2. Use the vehicle's existing fuel hard line as the fuel return line with modification to the sending unit and pick-up.
   3. Use the vehicle's existing return line (*if equipped*) as the fuel return line.

   NOTE: *Whichever method you use to install the fuel return line, it is very important to locate the in-tank fuel return line as far away as possible from the fuel pick-up (fuel feed line). This will eliminate any aerated return fuel that can be drawn into the fuel pickup.*
6. Determine the ideal mounting location for the new high pressure electronic fuel pump and primary fuel filter using the supplied mounting hardware. The primary fuel filter and the fuel pump must be mounted at or below the lowest point of the fuel tank. The fuel pump must also be mounted within 3 feet of the fuel tank as it is designed to push fuel from the rear of the vehicle towards the engine bay. Fuel pump failure will occur if not mounted within the required specification.



   NOTE*: Additional mounting brackets (not included in this kit) may be required to securely mount the fuel pump and fuel filters. Please note that the fuel pump is directional and must be installed with the terminal connections pointing towards the engine (See Figure 2 on Page 1).*
7. Using the 3/8" high pressure fuel hose, connect the fuel outlet on the fuel tank sending unit to the primary fuel filter inlet. Cut the fuel hose to length as needed and secure with hose clamps.

   NOTE*: The supplied 3/8" high pressure rubber fuel hose must be used as the main fuel supply line.*
8. Connect the primary fuel filter outlet to the fuel pump inlet using the 3/8" fuel hose. Cut fuel hose to length as needed and secure with hose clamps.
9. Connect the 3/8" fuel hose to the fuel pump outlet and secure with a hose clamp. Route the fuel hose towards the engine bay.

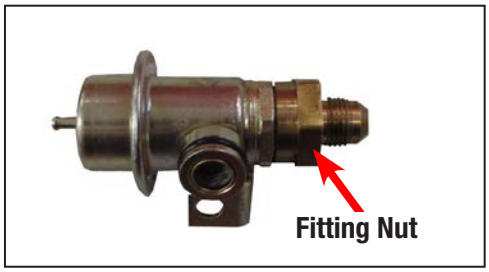
   NOTE: *DO NOT route fuel hose around sharp objects, moving components or exhaust components.*
10. Prepare the hose end that will attach to the fuel return fitting as depicted in step 5. Connect the return fuel hose to the sending unit plate.

    NOTE: *Return fuel hose tank connection will vary depending on the application and method chosen during step 5.*
11. Connect the POSITIVE (+) and NEGATIVE (-) leads to your EFI system's fuel pump power, fuel pump relay or fuel pump power source accordingly (See Figure 3).
12. Secure the fuel lines and fuel pump wires using the provided tie wraps, every 8-10 inches. Additional tie wraps may be required.

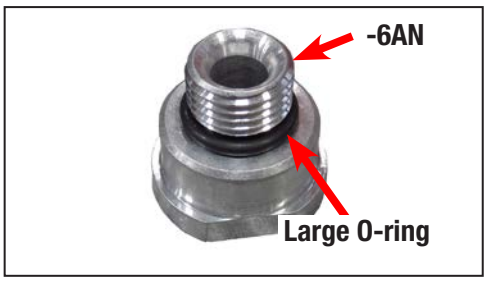
NOTE: *Steps 13-20 are for assembling the rail mounted fuel pressure regulator to the fuel rail.*

13. Assemble the small O-ring to the fitting nut as shown.

14. Lubricate the O-ring on the fitting nut with silicone lube and tighten the fitting nut onto the regulator with a 15/16" wrench.



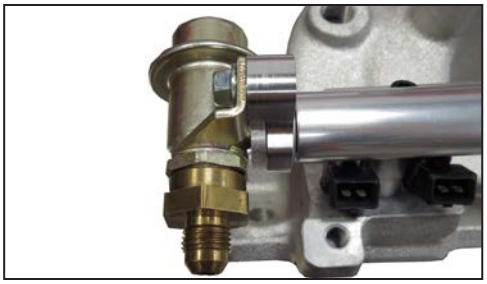
15. Assemble the large O-ring to the swivel body and apply silicone lube to the O-ring.



16. Slide the clamp ring over the swivel body as shown so the protruding end faces away from the rail. Tighten the swivel body with a 7/8" wrench until it is firmly seated into the fuel rail.

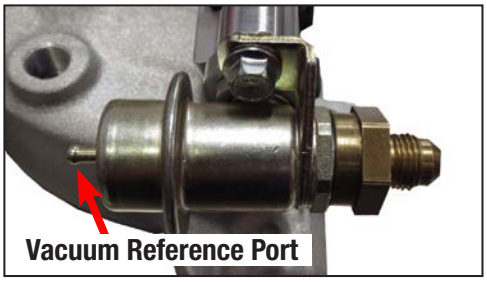
NOTE*: Do not overtighten the swivel body into the rail. The clamp ring should be able to move freely between the rail and the swivel body.*

17. Lubricate the O-ring on the regulator with silicone lube and push the regulator evenly into the swivel body.

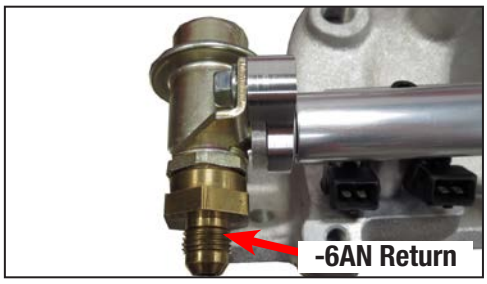


18. Rotate the fuel pressure regulator to the most convenient orientation for your application then line up the clamp ring to the mounting hole on the regulator. Insert the included 10mm bolt and tighten the regulator to the clamp ring.

19. Connect the fuel pressure regulator vacuum reference port to an appropriate location on the manifold.



20. Using the supplied Twist-Lok fittings, connect the 3/8" fuel return hose from the fuel tank to the fuel pressure regulator outlet. Trim fuel hose to length as needed.



NOTE*: Twist-Lok fittings do not require additional hose clamps.*

Depending on your application and specific routing needs, additional fuel fittings may be required. These fittings are available at your local Russell Performance dealer. The regulator uses -6 AN fittings.

21. Reconnect the NEGATIVE (-) terminal on the battery and turn the key to the “ON” position, DO NOT start the vehicle yet. With the key in the “ON” position, check all fuel connections for leaks. If leaks are present, immediately turn the key off and repair all leaks before continuing.

22. If leaks are not present, turn the key off and back to the “ON” position to verify the pump is priming.

    ***NOTE**: The following fuel pump priming procedure is intended for the Edelbrock E-Street EFI system only. If using another EFI system, please refer to the installation manual of that system for specific fuel pump priming procedures.*

    Pump will make a pumping/priming noise for 5-8 seconds when the key is first turned on. Fuel pressure can also be verified with a fuel pressure gauge (if equipped). If using the Edelbrock E-Street EFI system, the fuel pressure can be monitored on the Display Screens using the tablet. If pump is not priming, verify that the fuel pump harness and relay harness are installed correctly.

23. If the fuel pump is cycling, the fuel system can now be primed. This is done by cycling the key on and off 3-4 times to build a steady pressure in the fuel system. Once the fuel system has been primed, the installation of the fuel system is complete.

    ***NOTE**: It is not advised to start the vehicle until the completion of the EFI installation. Once the vehicle can be started, double check all fuel connections for leaks.*

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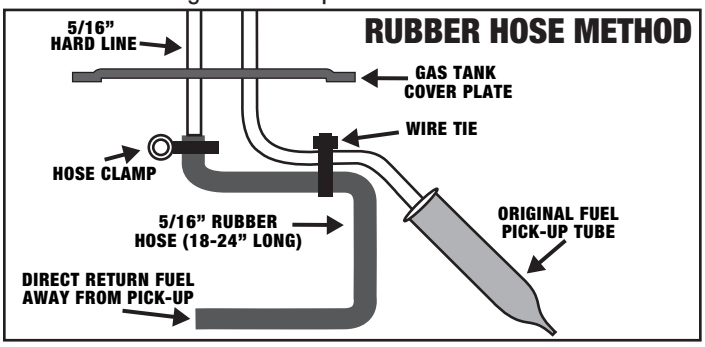
RUBBER RETURN LINE

Method 1a - Weld in a 5/16" Hard Line Fitting

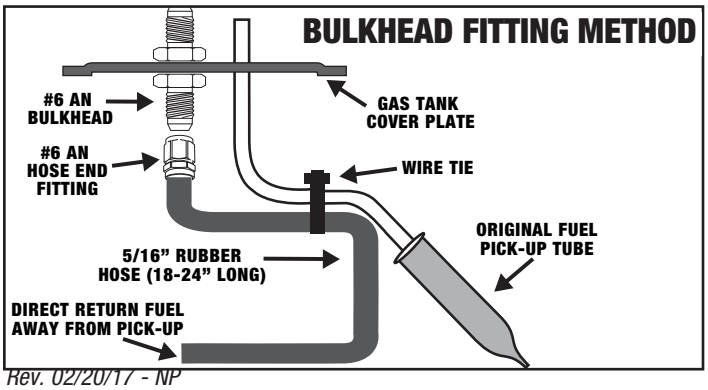
WARNING: *It is never recommended to perform any type of welding on your existing fuel sending unit as fuel and fuel vapors may be present. To avoid fire hazards, it's highly recommended to perform this method on a brand new sending unit.*

Remove the sending unit from the fuel tank and discard. Drill a 5/16" hole in the sending unit plate adjacent to where the main line enters the tank. This will be the hole for your return line. Insert a straight 5/16" hard line (*available at most radiator shops*) into the hole so that the line extends 1-2 inches on both sides of the sending unit plate. Secure the hard line and weld it to the sending unit cover plate. Attach at least 18-24 inches of 5/16" submersible fuel hose (Gates #27093 SA30R10 or equivalent) to the hard line that will extend into the fuel tank, secure with a hose clamp. Direct the in-tank fuel line away from the pick-up and secure it to the fuel pickup line using tie wraps. Install the sending unit cover plate onto the fuel tank.



Method 1b - Using a -6 AN Bulkhead Fitting

Remove the sending unit from the fuel tank. Drill a 9/16" hole in the sending unit plate adjacent to where the main line enters the tank. This will be the hole for your return line. Insert a -6 AN bulkhead fitting (*available at your Russell Performance dealer - #670850*) into the hole with the tapered end of the fitting on the inside of the plate. Fasten the fitting to the plate with the nut and PTFE washer. Install approximately 18-24 inches of 5/16" submersible fuel hose (Gates #27093 SA30R10 or equivalent) to a -6 AN hose end fitting (*not included*) and connect the hose end fitting to the tapered end (*inside fuel tank*) of the bulkhead fitting. Direct the line away from the pick-up and secure it to the fuel pickup line using tie wraps. Reinstall the sending unit cover plate. Another -6 AN hose end fitting will be required for the 5/16" return line that will connect to the other end of the bulkhead fitting.

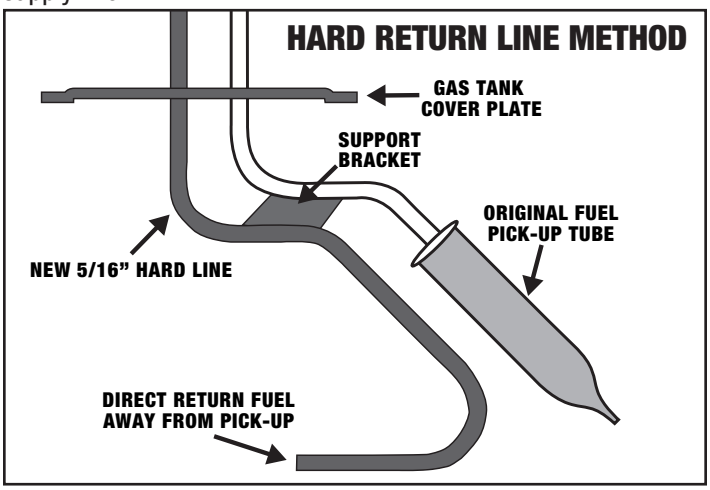


HARD RETURN LINE METHOD

Use the factory hard fuel supply line as a return line.

WARNING: *It is never recommended to perform any type of welding on your existing fuel sending unit as fuel and fuel vapors may be present. To avoid fire hazards, it's highly recommended to perform this method on a brand new sending unit.*

Remove the sending unit from the fuel tank and discard. Drill a 5/16" hole in the sending unit plate adjacent to where the main line enters the tank. This will be the hole for your return line. Insert the 5/16" hard line (*available at most radiator shops*) into the hole. The hard line should extend through the hole 1 to 2 inches on the outside of the plate. On the inside of the plate, the hard line should follow the contours of the fuel pickup line with the end of the return line bent 12-18 inches away from the pick-up sock. Weld the 5/16" hard line into place and secure to the fuel pickup line with a support brace. Reinstall sending unit cover plate and connect 5/16" hard line inlet to the factory fuel supply line.



FACTORY RETURN LINE METHOD

If vehicle is equipped with a factory fuel return line. Simply connect the return line located in the engine bay to the return outlet on the fuel pressure regulator. Modifications may be required to the factory return line. Please use appropriate fuel fittings to avoid any fuel leaks that may occur.

NOTE: *Whichever method you use to install the fuel return line, it is very important to locate the in-tank fuel return line, as far away as possible, from the fuel pick-up (fuel feed line). This will eliminate any aerated return fuel that can be drawn into the fuel pickup.*