

INSTALLATION INSTRUCTIONS

FUEL PRESSURE REGULATOR-DAMPER (FPR-D)

Document# 19-0219

Support: info@radiumauto.com

CONTENTS

- 1x FPR-D Assembly:
 - Billet Aluminum Body
 - Billet Aluminum Caps
 - Interchangeable Orifice
 - Springs, SS
 - Spring Hat, SS
 - Diaphragms
 - Vacuum Barbs
 - Set Screw, SS
 - Jam Nut, SS
 - Cap Bolts, SS
- 2x 6AN Male Adapter Fitting
- 2x 8AN Male Adapter Fitting
- 1x 1/8" NPT Plug
- 1x Interchangeable Orifice
- 1x Vacuum Hose
- 1x Vacuum Y-adapter
- 6x M6 Bolt, Stainless
- 4x M6 Flange Nut
- 1x Mounting Bracket



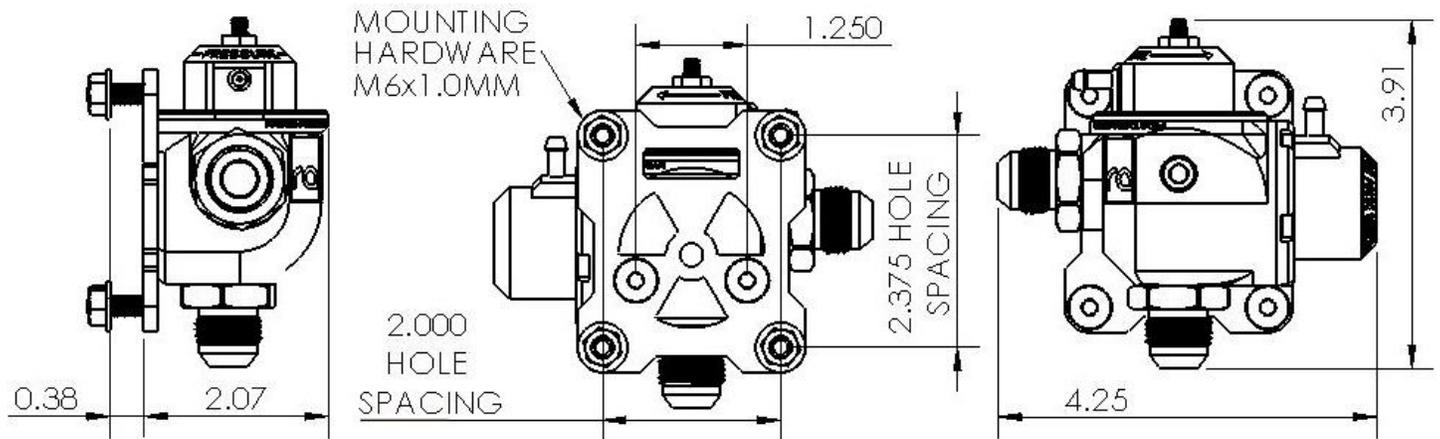
CAUTION: Exercise extreme caution when working with the fuel system. Do not smoke or expose the working area to any spark or flame. Work in a well-ventilated area. Clean up all spilled fuel immediately and dispose cleaning materials in a sealed metal trash container. **To prevent failure, all O-ring fittings MUST be lubricated prior to assembly.**

NOTICE: Some pressure bleed-off may occur when fuel pump is turned OFF. This is NOT a sign that the fuel pressure regulator is malfunctioning. This is normal behavior. If pressure drops quickly to zero after pump is turned OFF, contact Radium Engineering technical support for more information.

INSTALLATION

MOUNTING

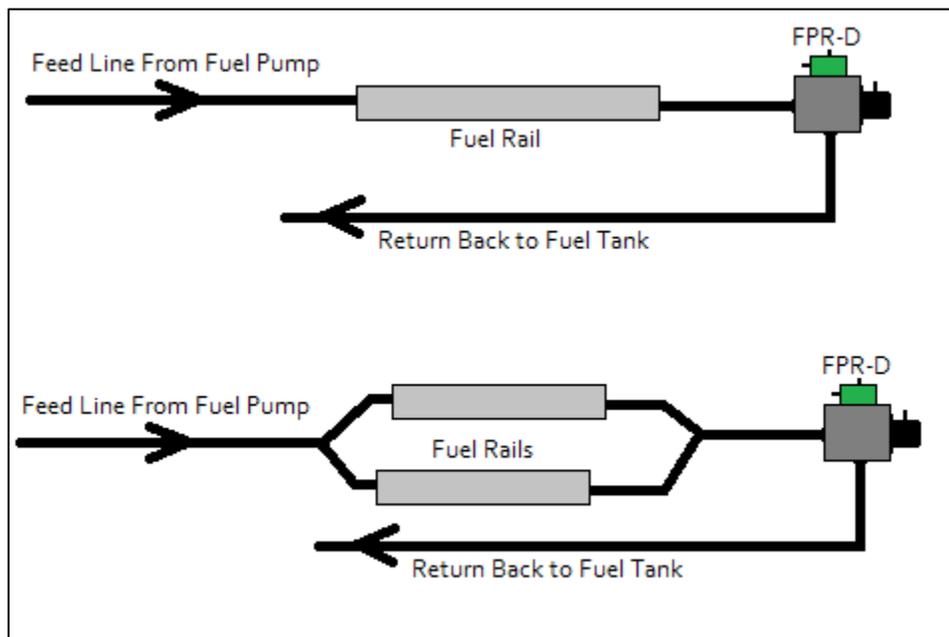
The FPR-D can be mounted with or without the mounting bracket (using the 2 threaded holes in the body). Furthermore, the FPR-D can be mounted in any direction including upside down, if required.



PLUMBING

The FPR-D must be plumbed after the fuel rail(s). Refer to the diagrams below for a couple examples.

The ports on the FPR-D are female threaded for -10AN ORB fittings. Some adapter fittings are included with the kit. If different size adapters are required, visit www.radiumauto.com to see a large selection of adapter fittings compatible with the 10AN ORB ports. It is recommended to use a 6AN return line size.



VACUUM REFERENCE

There are 2 vacuum barbs on the FPR-D. The barb for the FPR (fuel pressure regulator) and the barb for the FPD (fuel pulse damper) are for a 1:1 intake manifold reference and can be used with a 3/16" rubber vacuum hose. NOTE: Radium P/N: 14-0369 can be used to convert to a 3AN hose connection.

The vacuum/boost reference maintains a constant pressure ratio between the fuel pressure and the intake manifold pressure for consistent fuel delivery. If the vehicle used a vacuum reference from the factory, route two hoses to the barbed nipples on the FPR-D using the provided Y-adapter. If no pressure reference is needed, leave the barbs open to atmosphere, do NOT plug them.

NOTE: the FPR and FPD billet caps can be orientated to point the barbs fitting in 5 different directions. See the servicing information below for more details. Diaphragm damage from reassembly error voids warranty.

INTERCHANGEABLE ORIFICE

Two interchangeable orifices are provided with different inside flow diameters. This is required in order to match the pump(s) flow rate, fuel hose restrictions, and targeted base static fuel pressure. The 0.175" silver orifice is a good starting point for low to mid flowing fuel systems. However, if multiple high flow pumps are used in a low static pressure system, the 0.250" gold orifice can easily be swapped using common tools. ***If the return line is too restrictive, the return line may vibrate with fuel pressure flutter at low engine demands (idle). There is a stainless steel orifice available (P/N: 14-0772 sold separately) that may help this issue.***

**These recommendations are only general suggestions to get started. Backpressure created by return line system, operating voltage and line pressure drop will have an influence on the final static pressure and orifice selection.*

Orifice Color	Manufacturer Rated Flow @ 43.5psi
Silver	Up to 900 LPH total flow
Gold	Up to 1500 LPH total flow

MONITORING FUEL PRESSURE

A gauge or transducer must be used to set fuel pressure. Sometimes these are available in other parts of the fuel system such as directly on the fuel rail(s) or on the feed line for instance. It is best to monitor pressure as close to the fuel rail(s) as possible. A gauge or transducer can be installed in the 1/8" NPT port.

FUEL PULSE DAMPER

For optimal damping efficiency, static FPR fuel pressure should be set within the pressure range etched on the FPD cap. Overall fuel pressure can exceed those values, but only if the FPD barb is vacuum referenced.

FUEL PRESSURE ADJUSTMENT

The regulator is NOT pre-set to any particular pressure out of the box. It can be fine-tuned for the specific application using a fuel pressure sensor or gauge. **Determine the target static fuel pressure setting before beginning this procedure.** Consult with the EFI tuner, or match the pressure setting specified by the manufacturer. To set static fuel pressure:

- Disconnect the vacuum line from the FPR barb. Temporarily plug the vacuum line to prevent a leak. During this test, leave the regulator barb open to atmosphere to allow venting.
- Activate the fuel pump manually or by starting the engine.
- Loosen the jam nut on top of the regulator using a 3/8" wrench.
- Using an 3/32" Allen wrench:
Tighten set screw (clockwise) to increase pressure. Loosen set screw (counter-clockwise) to decrease pressure.
- Once fuel pressure is set at the target reading, tighten the jam nut.
- Turn OFF the engine and secure the vacuum hose to the regulator port.

PRESSURE REGULATOR SERVICING

- Relieve fuel pressure. Back out the set screw using 3/32" Allen wrench.
- Gradually remove the five #5-40 screws in an alternating cross-pattern sequence using a 5/64" Allen wrench.
- Inspect the FPR diaphragm for excessive wear or damage.
- For replacement parts, please contact Radium Engineering.
- To change the orifice, use a 7/16" socket wrench.
- Reference diagram for reassembly. The diaphragm and seating surfaces MUST be clean for proper sealing.
- BE CAREFUL NOT TO INSTALL THE SPRING HAT UPSIDE DOWN
- Orientate the top cap to point the vacuum barb as needed.
- Tighten the 5 screws gradually in an alternating cross-pattern sequence.

Troubleshooting Guide

Symptom	Possible Causes	Solution
Pressure too high, despite adjustment screw fully backed out.	Orifice too small. Restriction in return line.	1. Confirm orifice is secured and tight. 2. Install larger orifice. 3. Run a temporary hose from the regulator return port (bypassing return line system on vehicle) to a bucket and re-check pressure.
Fuel leaking from vacuum nipple or adjustment screw.	Torn or unseated diaphragm allowing fuel into vacuum chamber of regulator.	Remove regulator top cap and inspect diaphragm. If diaphragm is damaged or torn, contact Radium for a replacement. If diaphragm is unseated, contact Radium tech support for resolution.
Adjustment screw has no change on fuel pressure	Fuel pressure gauge not installed in correct part of fuel system (such as on the return line). Regulator missing the spring hat.	Make sure pressure gauge is installed on the high pressure side of the system and not on a return port or the return line. Remove adjustment screw and look into threaded hole on top of regulator. Make sure the spring hat is immediately visible.
Fuel pressure too low despite tightening the adjustment screw down.	Most likely a weak pump or leak in the fuel system prior to the regulator. If fuel is coming out of vacuum nipple, replace diaphragm.	Check all in-tank hoses and plumbing. Replace pump. Ensure pump is getting full power and wire gauge is adequate. If dual pumps, make sure a check valve is in place between pumps.
Fluttering noise from the regulator or fuel lines.	Orifice is too big for pump flow.	Install a smaller orifice.
Fuel leaking between the top cap and regulator body.	Diaphragm has become unseated.	Contact Radium tech support for resolution.
Pressure spikes during on/off throttle driving.	Orifice may be too small.	Install larger orifice.
Small vacuum leak on top side of diaphragm.	Tiny air leak around the threads of the adjustment screw. This is normal and not enough of an air leak to impact engine or fuel system performance.	Apply a conservative amount of sealant around the threads of the pressure adjustment screw where it threads into the top cap of the regulator.

