

INSTALLATION INSTRUCTIONS

DUAL FUEL PRESSURE REGULATOR (DFPR)

Document# 19-0377

Support: info@radiumauto.com

WARNING! Exercise extreme **CAUTION** when working with fuel systems. 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 fuel safe trash container. Relieve fuel pressure prior to working on the fuel system. **To prevent failure, all O-ring fittings MUST be lubricated prior to assembly.**

OVERVIEW

The Radium Engineering DFPR was designed specifically for custom fuel systems that use both direct injection and port injection. The DFPR permits independent fuel pressures for each system while using 1 fuel feed input. Furthermore, the architecture suppresses the aggressive pressure spikes created by the mechanical (positive displacement plunger-type) pump used for direct injection. This is commonly called a high pressure fuel pump (HPFP).

NOTES:

1. FPR1 is used for direction injection and FPR2 is used for port injection.
2. FPR2 pressure will always be equal to or less than FPR1 pressure. It cannot physically be higher.
3. If FPR2 is 1:1 boost referenced, FPR1 pressure will increase accordingly to match FPR2.

PORTS

The DFPR is equipped with 6 fuel ports total. Use the included adapter fittings and plugs to configure the DFPR for installation. For the 4 main ports, lubricate the O-ring on the adapter fittings. For the tapered threads use PTFE plumber's paste.

PUMP IN

THREADS: 8AN ORB (3/4"-16)

FPR1 OUT

THREADS: 8AN ORB (3/4"-16)

FPR2 OUT

THREADS: 8AN ORB (3/4"-16)

RETURN

THREADS: 8AN ORB (3/4"-16)

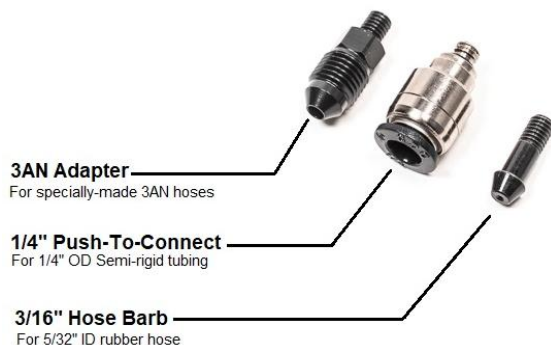
AUXILIARY SENSOR PORT (x2)

THREADS: 1/8"-27 NPT



VACUUM REFERENCE

Multiple unique adapters are provided for the vacuum ports. A vacuum reference should be utilized if a 1:1 reference is required. For port injection, this maintains a constant ratio between fuel pressure and intake manifold pressure for consistent fuel delivery. When choosing the intake manifold vacuum signal location, it is not advised to use a single intake manifold runner. The best signal will come from the intake manifold plenum which has the most stable pressure. NOTE: For constant pressure (used in direct injection fuel systems), plug the reference port using the provided screw.

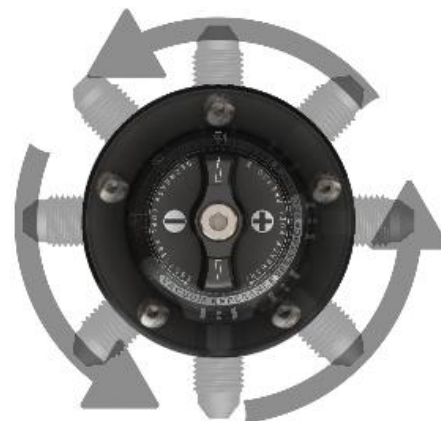


When installing the vacuum fitting, use a wicking thread locking compound, such as LOCTITE 290. If not available, any other medium strength thread locking compound can be used. Take care not to allow the thread locking compound in the air passage of the vacuum adapter.

NOTES:

1. Simply finger tighten the fitting.
2. If installing the 3AN fitting, do NOT over torque. Be sure to hold the fitting with a wrench when securing the hose end. These are manufactured from high strength steel, but are very small.

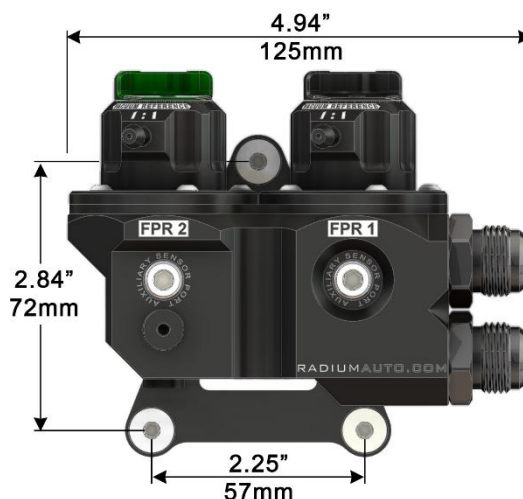
The vacuum port has the ability to rotate 360 degrees about the regulator bodies. This permits the installer to point the vacuum fittings in any direction.



INSTALLATION

MOUNTING

Choose a mounting location away from hot engine parts. Use the supplied mounting bracket and M6x1mm screws and flange nuts to secure the regulator to a rigid structure. The DFPR can be mounted in any orientation including upside down.



DFPR



PLUMBING

The DFPR is designed to be plumbed upstream (before) the HPFP and port injection fuel rail(s).

- **PUMP IN:** This port is the only inlet. The low pressure fuel pump (LPFP) outlet should be plumbed to a low micron fuel filter and then secured to this port.
- **FPR1 OUT:** This port should be plumbed directly to the high pressure fuel pump (HPFP) inlet.
- **FPR2 OUT:** This port should be plumbed directly to the port injection fuel rail(s). Plug the opposing end of the fuel rail(s). NOTE: If the engine does not have port injection, this port can be plugged with no affect to FPR1. For FPR1 to work efficiently, spin the FPR2 knob fully counterclockwise.
- **RETURN:** This port should plumb directly to the fuel tank (or fuel cell). NOTE: If there is no return port on the fuel tank, Radium Engineering has barbed adapters that permit fuel to return into the fuel filler pipe.
- **AUXILIARY SENSOR PORT (x2):** To monitor FPR1 and FPR2, these ports can be used for gauges, sensors, etc. Plugs are included.

START UP/LEAK CHECK

After installation, perform a leak check to be sure all components are installed correctly.

- Connect the battery.
- Allow the fuel pump to prime the system.
- Cycle the ignition power a few times and check for fuel leaks.
- If there are leaks, they must be corrected before proceeding.
- If no leaks, proceed to fuel pressure adjustment.

FUEL PRESSURE ADJUSTMENT

To set fuel pressure, a gauge or sensor must be used. Sometimes these are already used in other parts of the system such as on the fuel rail(s) or feed line for instance. It is best to monitor pressure as close to the fuel rail(s) as possible.

The regulators are NOT pre-set to any particular pressure out of the box. Determine the target static fuel pressure 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 vacuum port, if applicable.
- Temporarily plug the line to the intake manifold to prevent a vacuum leak.
- Activate the fuel pump manually or by starting the engine.
- Tighten the knobs (clockwise) to increase fuel pressure.
- Loosen the knobs (counter-clockwise) to decrease fuel pressure.
- If not using FPR2, spin the knob fully counterclockwise for FPR1 to work efficiently.
- FPR2 pressure will always be equal to or less than FPR1 pressure. It cannot physically be higher.
- If FPR2 is 1:1 boost referenced, FPR1 pressure will increase accordingly to match FPR2.
- Turn OFF the engine and reattach the line back to the vacuum port, if applicable.

NOTES:

1. If not using port injection, spin the FPR2 knob fully counterclockwise for FPR1 to work efficiently.
2. Fuel pressures will stay at the set pressure. No locking is necessary. Do not attempt to the tighten the Allen screws.
3. Some installations may experience a rapid fall of fuel pressure when the engine and/or fuel pump shuts off. This is considered normal operation for aftermarket fuel pressure regulators, regardless of brand. This can occur due to the diaphragm seat and the return orifice not fully sealing when fuel flow is stopped. For regulators to have the ability to regulate high fuel flow rates, the size of these components must be increased. This creates larger sealing surfaces between the components, preventing them from forming a perfect seal, even with high spring rates. This is not an indication of an issue or defect and it is not a cause for concern on its own. Do NOT contact technical support about this issue. Fuel pressure will reset immediately when the fuel pump is activated again. If the engine is experiencing other symptoms such as long cranking to start, or delays in pressure building when cranking, these symptoms are unrelated to the regulator. There is likely an issue with the fuel feed hose draining back to the tank. This is most likely due to an internal leak somewhere in the pump module, ie: a venturi jet pump, or the lack of a fuel pump check valve.

SERVICING

- Relieve fuel pressure.
- Using a 5/64" Allen wrench, gradually remove the five #5-40 screws in an alternating cross-pattern sequence.
- Inspect the regulator diaphragms for excessive wear or damage.
- For replacement parts, contact Radium Engineering (info@radiumauto.com).
- The diaphragm and seating surfaces MUST be clean for proper sealing.
- Tighten the 5 screws gradually in an alternating cross-pattern sequence to 6 in-lbs.
- Shown is a replacement FPR diaphragm, P/N: 18-0017

