# INSTALLATION INSTRUCTIONS

1x   **MPR Assembly:**
      -Billet Aluminum Body
      -Billet Aluminum Cap
      -Interchangeable Orifice
      -Spring, Grounded
      -Spring Hat
      -Diaphragm
      -Vacuum Barb
      -Set Screw, SS
      -Jam Nut, SS
      -5 Cap Bolts, SS

- 2x **9/16-18 Port Plug**
- 1x **3/4-16 Port Plug**
- 3x **Fitting, -6AN Male**
- 1x **Fitting, -8AN Male**
- 1x **Interchangeable Orifice**
- 2x **M6 Bolt, Stainless**
- 2x **M6 Flange Nut**
- 1x **Mounting Bracket**
- 1x **Instruction Manual**
- 1x **20-0121, Gauge (Optional)**
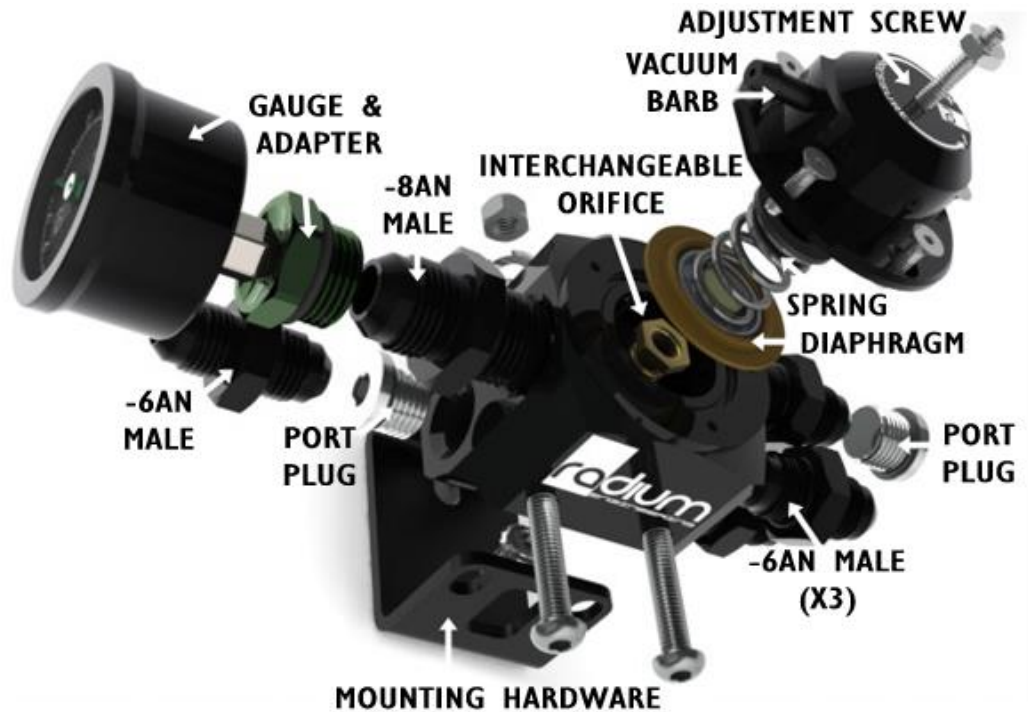


**CAUTION:** Exercise extreme caution when working with the fuel system. Do not smoke or expose the working area to any spark or flame.  Work in a well-ventilated area. Clean up all spilled fuel immediately and dispose cleaning materials in a sealed metal trash container. **To prevent failure, all O-ring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

## FITTINGS AND PORTS

| | |
|---|---|
| **A** | Inlet from pump or output to fuel rail |
| **B** | Inlet from pump or output to fuel rail |
| **C** | Return to fuel tank (or surge tank) |
| **D** | Return to fuel tank (or surge tank) |
| **E** | Inlet from pump or output to fuel rail |
| **F** | Vacuum reference port |
| **G** | Pressure adjustment screw |



## PORT THREAD SIZES

**A, B, C, D:** -6AN ORB (9/16"-18)
**E:** -8AN ORB (3/4"-16)
*Do not use thread pastes or tapes on the fittings for these ports.*
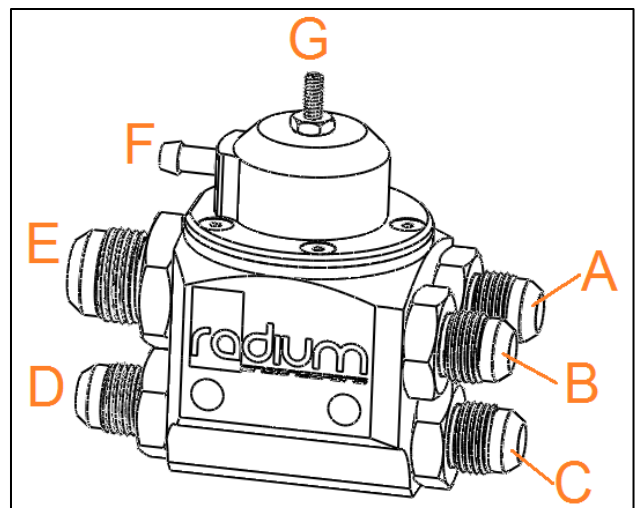
The Radium Engineering MPR features a unique design that allows multiple options for plumbing fuel lines. Ports A, B and E all connect to the same chamber; this is the regulated fuel pressure chamber. Ports C and D are the fuel return chamber. At least one fuel return port must be used (either C or D) to allow fuel bleed off to occur and pressure to be maintained. Plug the return port that is not used using a -6AN ORB (9/16"-18) port plug.

**NOTICE**: **Pressure bleed off when fuel pump is turned off is <u>NOT</u> a sign that the pressure regulator is malfunctioning. <u>This is normal behavior</u>. Different factors can influence how fast or slow the bleed off may occur. Allow the fuel system to prime before restarting the engine.**

## INSTALLATION

### Mounting the MPR
The MPR can be mounted with or without the mounting bracket (using holes through the body). Furthermore, the MPR can be flipped 180 degrees if a particular side of the MPR is more important than the other. The MPR can be mounted in any direction including upside down, if required. The dimensioned drawings (below) illustrate both mounting scenarios.
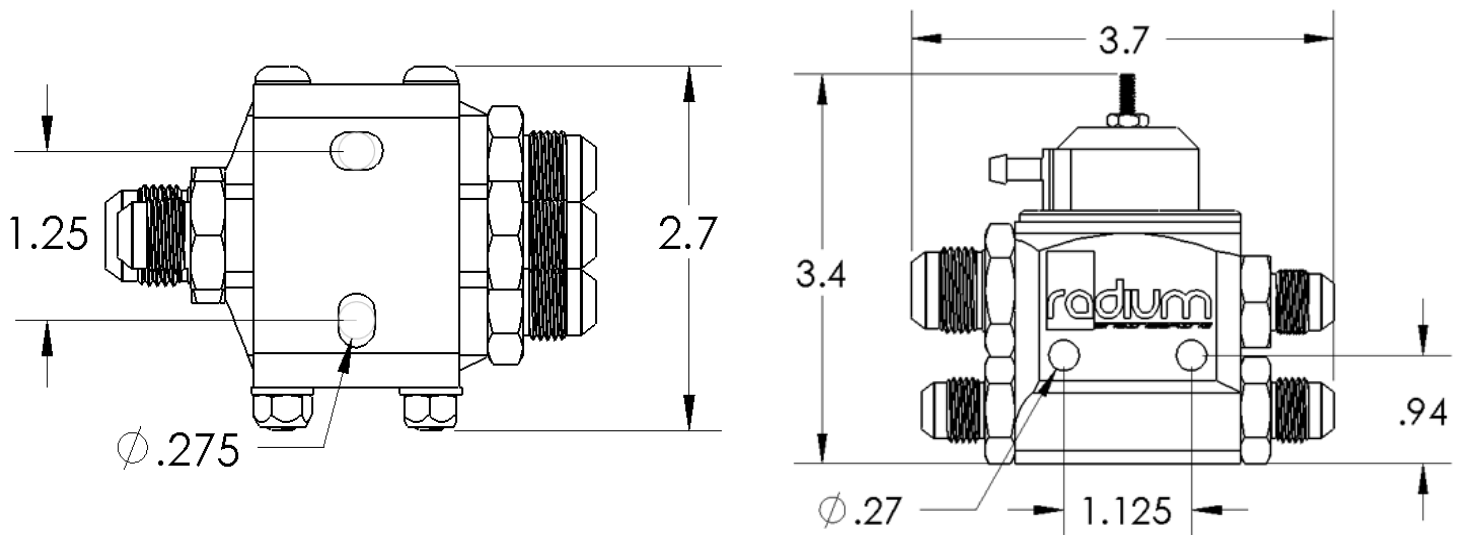
### PLUMBING EXAMPLES
There are many ways that the MPR can be plumbed. All methods will use ports C or D as a return back into the fuel tank or fuel surge tank (if applicable). Below are some examples of common ways to plumb the regulator. DO NOT USE ANY PTFE (TEFLON) TAPE OR PASTE ON ANY OF THE PORT FITTINGS.

**Traditional Return Style**

**Dead-End Style with Two Fuel Pumps**

PUMP → A
PUMP → B
MPR → E → TO ENGINE/FUEL RAIL
C

OE FUEL TANK or FUEL CELL
or FUEL SURGE TANK
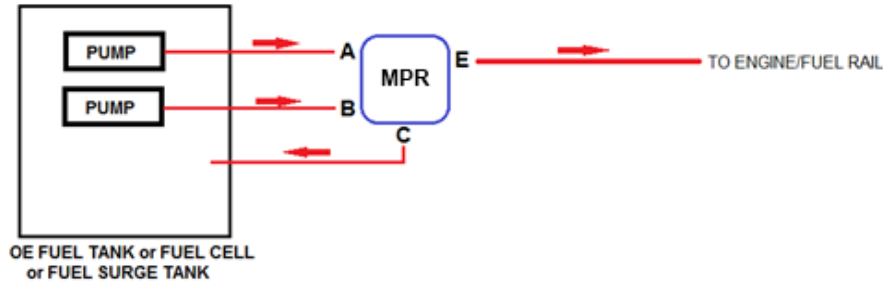
**VACUUM REFERENCE**

The small vacuum barb on the regulator is for a 1:1 vacuum reference and can be used with a 3/16" rubber vacuum hose. Radium adapter fitting 14-0369 can be installed in the regulator vacuum port for connection of a 3AN vacuum hose.

The vacuum/boost reference maintains a constant pressure ratio between the fuel pressure and the intake manifold pressure for consistent fuel delivery. If the factory vehicle used a vacuum line to the pressure regulator, route this hose to the barbed nipple on the MPR. If no pressure reference is needed, leave vacuum barb on the regulator open to atmosphere, do NOT plug.

NOTE: the billet cap can be orientated to point the barb fitting in 5 different directions. See the servicing information below for more details.

**INTERCHANGEABLE ORIFICE**

This regulator is equipped with 2 interchangeable orifices 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. See the servicing information below for more details.

### Interchangeable Orifices

Silver colored orifice factory installed

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

*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.*

**MONITORING FUEL PRESSURE**

A fuel pressure 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 can be installed on ports A, B or E. Radium Engineering offers a variety of 8AN ORB and 6AN ORB adapter fittings to make this possible.
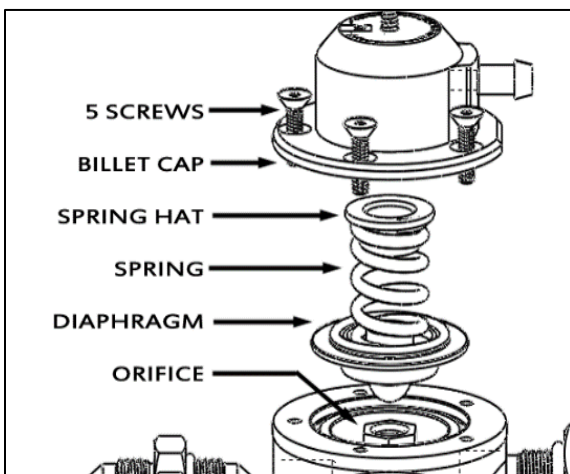
**FUEL PRESSURE ADJUSTMENT**

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 what the target static fuel pressure setting should be before beginning this procedure**. This target setting can be different for many vehicles. Consult with the EFI tuner, or match the factory pressure setting specified by the manufacturer. To set static fuel pressure:

- Disconnect the vacuum line from the regulator and 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 the set screw (clockwise rotation) to increase fuel pressure.
  Loosen the set screw (counter-clockwise rotation) to decrease fuel 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.


**SERVICING**
- Relieve fuel pressure. Back out the pressure 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 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. | 1. Orifice too small.<br>2. Restriction in return line. | 1. Install next largest orifice.<br>2. Run a temporary hose from the regulator return port 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. |
| Unstable pressure adjustment over 60psi. | Internal spring fully compressing. | Contact Radium for an updated replacement spring. |
| Fluttering noise from the regulator or fuel lines. | Orifice is too big for pump flow. | Install a smaller orifice. |
| Fuel leaking from 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 next largest orifice. |
| Small vacuum leak on top side of diaphragm. | Minute air leak around the threads of the adjustment screw. | Apply a conservative amount of thread sealant around the threads of the pressure adjustment screw where it threads into the top cap of the regulator. |