

# INSTALLATION INSTRUCTIONS

MULTI-PORT REGULATOR (MPR-RA)

Document# 19-0334

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.**

## PORTS

The Radium Engineering MPR-RA is equipped with several ports for both feed and return, making it extremely versatile and an ideal regulator for custom fuel systems. Many installations will not use all available ports. Use the included adapter fittings and plugs to configure the regulator for the installation. Do not use PTFE paste or tape in these ports, simply lubricate the O-ring on the adapter fittings with a small amount of oil.

### PORT "A & B"

6AN ORB (9/16"-18) threads

These ports are for high pressure fuel and should be plumbed to/from the fuel rail or fuel pump.

### PORT "E"

8AN ORB (3/4"-16) threads

Like ports A and B, this port is for high pressure fuel and should be plumbed to/from the fuel rail or fuel pump.

### RETURN PORT "C & D"

6AN ORB (9/16"-18) threads

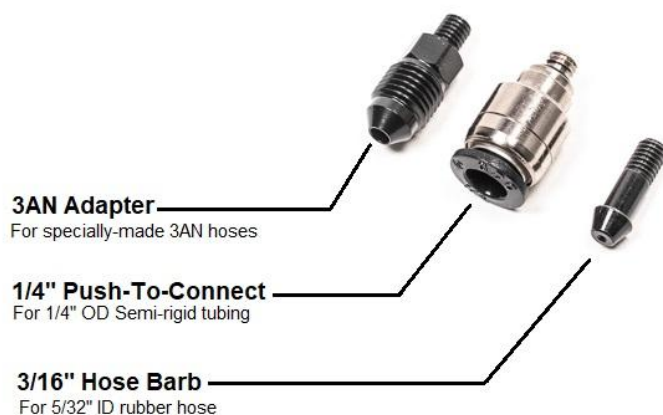
The bottom ports C and D are the return ports for bypassed fuel to return to the fuel tank. Choose one of these ports based on what works best for the fuel line plumbing and plug the other port with the included 6AN ORB plug.



# VACUUM REFERENCE

Multiple unique adapters are provided for the vacuum port.

A vacuum reference should be utilized if a 1:1 reference is required. This maintains a constant ratio between fuel pressure and intake manifold pressure for consistent fuel delivery. If the OEM pressure regulator used a vacuum hose, route the hose to the vacuum barb on the MPR-RA. 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 all returnless fuel systems), plug the reference port using the provided screw.

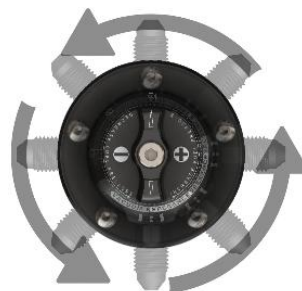


When installing the vacuum fitting, use a wicking thread locking compound, such as LOCTITE 290. If not available, any other medium strength thread locking compound can be used. Take care not to allow the thread locking compound in the air passage of the vacuum adapter. Simply finger tighten the fitting.

## 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 body. This permits the installer to point the vacuum fitting in any direction.



# RETURN ORIFICE

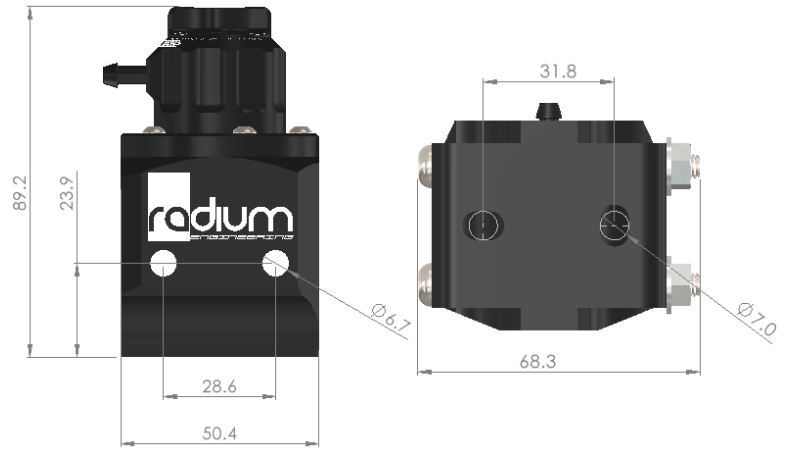
The regulator is equipped with a removable flow orifice. Radium Engineering has optimized the size, shape, and material of this orifice for all single and multi-pump applications. The orifice will NOT need to be changed for different fuel pump setups. This orifice should not need to be removed under any circumstances unless instructed by Radium Engineering technical support.



# INSTALLATION

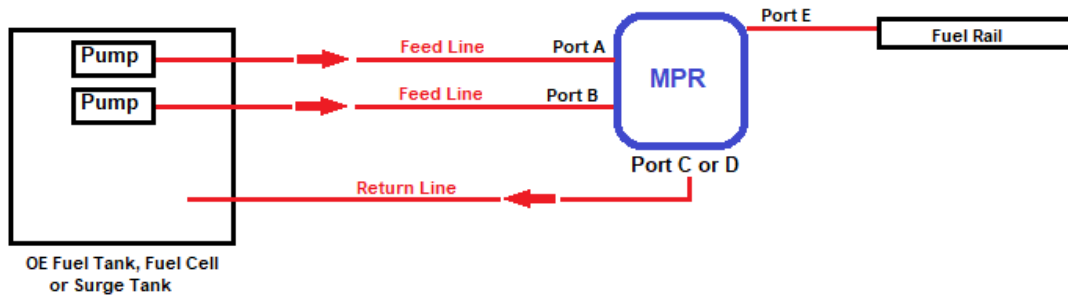
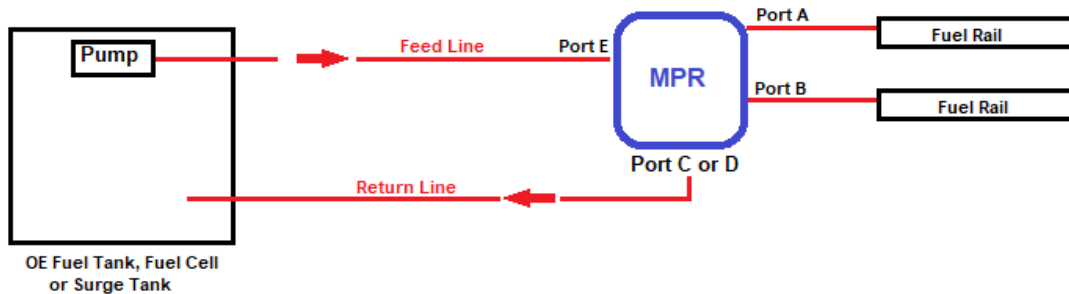
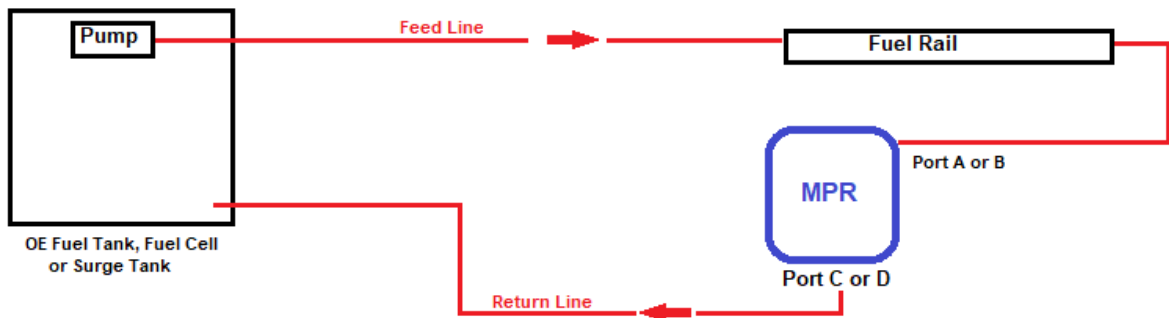
## MOUNTING

Choose a mounting location away from hot engine parts. Use the supplied mounting bracket and M6 screws to secure the regulator to a rigid structure. Do NOT hang the regulator on the end of the fuel rail (or other location) with an adapter fitting.



## PLUMBING

The MPR-RA can be plumbed either before or after the fuel rail(s). Below are several examples.



# START UP/LEAK CHECK

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

- Connect the battery.
- Turn the ignition to the ON position to allow the fuel pump to prime the system (do not start the engine).
- 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 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 regulator is 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.
- Leave the regulator port open to atmosphere to allow venting.
- Activate the fuel pump manually or by starting the engine.
- Tighten the knob (clockwise) to increase fuel pressure.
- Loosen the knob (counter-clockwise) to decrease fuel pressure.
- Turn OFF the engine and reattach the line back to the vacuum port, if applicable.

### NOTES:

1. Fuel pressure will stay at the set pressure. No locking is necessary. Do not attempt to the tighten the Allen screw.
2. 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 diaphragm for excessive wear or damage.
- For replacement parts, contact Radium Engineering ([info@radiumauto.com](mailto: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.
- Replacement FPR diaphragm shown, P/N: 18-0017

