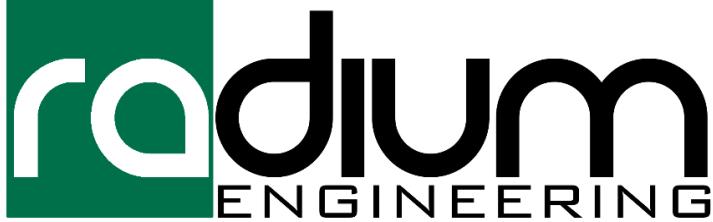


# INSTALLATION INSTRUCTIONS

## FUEL RAILS, FORD 302/351 WINDSOR

P/Ns: 20-1302 & 20-1302-PK



Document: 19-0376

Support: info@radiumauto.com

### COLOR LEGEND FOR EACH STEP

#### 20-1302 FUEL RAIL INSTALLATION

Follow WHITE areas below

#### 20-1302-PK PLUMBING KIT INSTALLATION

Follow YELLOW areas below

#### 17-0064 INJECTOR ADAPTER INSTALLATION

Follow BLUE areas below

### CAUTION

Only a qualified technician following applicable safety procedures should perform the installation of this product. One must have knowledge in repair and modification of fuel systems and general vehicle modifications to install this product.

**Gasoline and other fuels are flammable and can be explosive.**

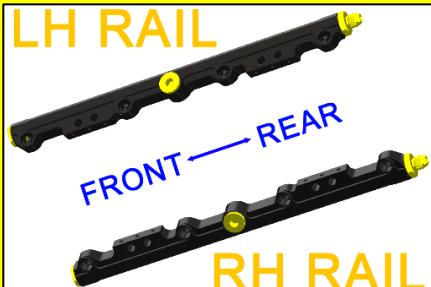
Only install in a well-ventilated location to minimize buildup of fuel vapors.

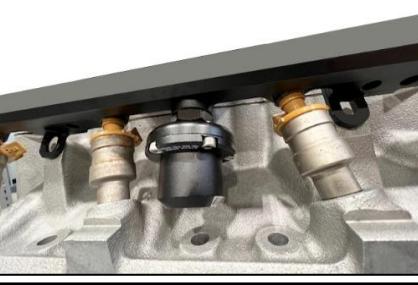
No sparks, open flames, smoking or other ignition sources are to be present. Draining and removal of all fuel from the fuel system is recommended. Proper eye and personal protection is required at all times during installation.

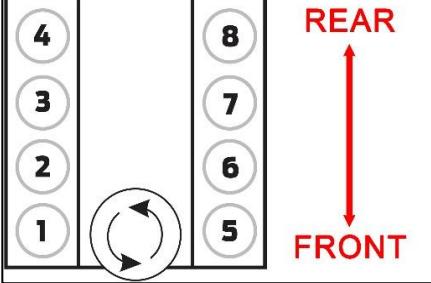
### WARNING

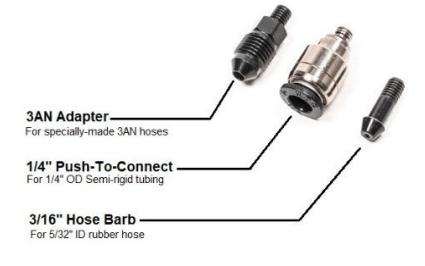
The fuel system is under pressure! Do not loosen any connections until relieving the fuel system pressure. Consult a service manual for instructions on relieving fuel pressure safely. This product is designed for off-highway and racing use only. Fuel system components may not be legal for sale or use on emissions controlled motor vehicles. Consult local, state, and federal laws.

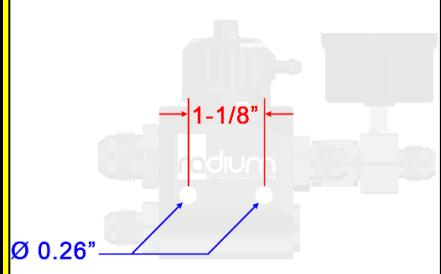
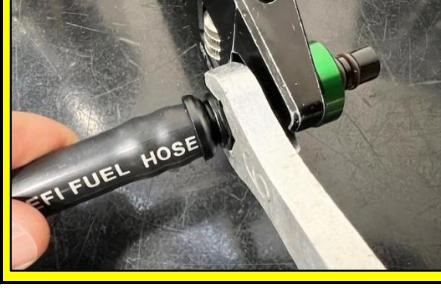
STEP	TOOLS NEEDED	INSTRUCTIONS	PHOTO
1		<p>NOTES</p> <p>a. The terms "driver-side" and "passenger-side" will NOT be referenced. These instructions will reference "LH" and "RH" areas of the vehicle.</p> <p>c. Aluminum wrenches are recommended to prevent surface marring.</p> <p>d. Lubricate all O-rings with a silicone based grease prior to installation.</p> <p>e. Prior to starting, record the current (dynamic) fuel pressure. This will be mimicked when adjusting fuel pressure later. If fuel pressure is not adjusted back to the prior settings, tuning may be necessary.</p> <p>f. To depressurize the fuel system, press-in the Schrader needle valve.</p>	
2	7/16" or 10mm Socket	<p>Disconnect the battery.</p> <p>CAUTION: Disconnecting the battery may cancel the fault memories of some control units.</p>	
3		<p>Because of the various compatible vehicles, removal of specific parts will not be covered. It is recommended to have a service manual.</p>	
4	T20 Torx 1/2" Socket	<p>Remove all related components from the vehicle to uninstall the upper intake manifold.</p>	

5	<p>On the fuel feed and return lines, pry off the fuel line safety clips that protect the spring lock connections. If the plastic tether is still attached, they can hang in place.</p>	
6	<p>Provided are 2 different sized spring lock disconnect tools. The large tool is used for the feed line and the small tool is used for the return line. First, push and hold the disconnect tool into larger diameter side of the spring lock connections. Next, pull the connections apart.</p> <p>NOTE: This may take some work if the lines have never been removed on the vehicle.</p>	
7	<p>Rag</p> <p>When removing the fuel lines, have a rag handy.</p> <p>To unplug the 8 fuel injectors, squeeze the connector locks and pull.</p>	
8	<p>Rag</p> <p>5/16" Socket Wrench</p> <p>Remove the four 1/4"-20 mounting screws. They will NOT be reused.</p> <p>Transport the fuel rail assembly to a work bench. To remove the injectors from the fuel rails, gently pull to release.</p>	
9	<p>Lubrication</p> <p>5/16" Allen Wrench</p> <p>7/8" Wrench</p> <p>19mm Wrench</p> <p><b>20-1302-PK PLUMBING KIT INSTALLATION</b></p> <p>Each rail has three 8AN ORB (3/4"-16) ports. Install the 8AN ORB plugs to the front and center ports. Install the 8AN ORB to 6AN fitting to the rear ports.</p> <p><i>Blue: Depicts the orientation when installed in the vehicle.</i></p> <p><i>Orange: Shows each fuel rail location when installed in the vehicle.</i></p> <p>NOTE: If this plumbing kit wasn't purchased, go to <a href="http://radiumauto.com">radiumauto.com</a> to find an array of compatible adapters.</p>	
10	<p>If fuel pulse dampers will be used, they must be purchased separately.</p> <p>If mounted in the center ports, the following manifolds are compatible with Radium Engineering 8AN ORB fuel pulse dampers (FPDs): 302 HO, GT40, Explorer, Cobra, and 351 intake manifolds.</p> <p>Because of the EGR fitting and casting bosses, Radium Engineering fuel pulse dampers are NOT compatible in the center fuel rail ports with the 302 truck lower intake manifold.</p>	

11	3mm Allen Wrench Thread Locker	<p>The included mounting feet must be installed with a medium strength thread locker in a specific location and orientation.</p> <p>Blue: Depicts the orientation when installed in the vehicle. Orange: Shows each fuel rail location when installed in the vehicle. Green Arrows: Correct screw holes to use per fuel rail. Red Arrows: Empty threaded holes to not use per fuel rail. Purple Arrows: Correct direction of the mounting feet holes.</p>	 <p><b>LH RAIL</b> FRONT → REAR</p> <p><b>RH RAIL</b></p>
12	Lubrication	<p>Inspect the 8 fuel injectors. If necessary, replace the upper and/or lower O-rings.</p>	
13	Lubrication	<p>For ease of installation, lubricate the injector O-rings, intake manifold injector seats, and fuel rail injector bores.</p> <p>Fully insert the injectors into the fuel rail bores, as shown.</p>	
14		<p>Line-up and place the fuel rail assemblies onto the lower intake manifold. Once everything is positioned correctly, push the fuel rails downward to fully seat the injectors (302 Mustang manifold shown).</p> <p>If Radium Engineering fuel pulse dampers were installed, verify if there is adequate clearance.</p>	
15	3/16" Allen Wrench	<p>Install the 4 black oxide stainless steel 1/4"-20 mounting screws.</p> <p>Temporarily place the upper intake manifold onto the lower intake manifold to verify there is fuel rail clearance.</p>	
16		<p>These fuel rails have very large bores. And to stay clear of the distributor and the upper intake manifold, they have a unique profile.</p> <p>Because of their physical shape, OEM fuel injectors will need to be strategically oriented inwards (towards the runners).</p> <p>Ford GT40 lower intake manifold shown.</p>	

17	<p>However, the connector on many aftermarket fuel injectors is lower. In this case, the injector connector can face outwards like normal.</p> <p>Shown at left is a short (34mm) Bosch EV14 injector with a billet top hat effectively making it 60mm tall. The mating connector would have no interference with the fuel rail.</p> <p>Shown at the right is an OEM Ford injector. The OEM mating connector <u>would have interference with the fuel rail</u>.</p>	
18	<p>Shown at left is a full height (60mm) Bosch EV14 injector. The mating connector would have no interference with the fuel rail.</p> <p>Again, shown at the right is an OEM Ford injector. The OEM mating connector would have interference with the fuel rail.</p>	
19	<p>For Ford GT40 lower intake manifolds in particular, note the injector connector interference in the picture a few steps above. These 2 areas are found at cylinder 6 and cylinder 7.</p>	
20	<p><b>17-0064 INJECTOR CONNECTOR ADAPTER INSTALLATION</b></p> <p>If there is any interference with rotating the fuel injector connectors inwards, purchase Radium Engineering P/N: 17-0064 Bosch EV14 Injector connector adapter (shown) for each area of concern.</p>	
21	<p><b>17-0064 INJECTOR CONNECTOR ADAPTER INSTALLATION</b></p> <p>To install 17-0064, press each female terminal into the fuel injector pins. NOTE: Fuel injectors are simple solenoids. There is no polarity, ie: terminals can NOT be accidentally crisscrossed.</p>	
22	<p><b>17-0064 INJECTOR CONNECTOR ADAPTER INSTALLATION</b></p> <p>Move the 17-0064 injector plug into an ideal location for reconnecting the OEM wire harness.</p>	

23		<p><b>20-1302-PK PLUMBING KIT INSTALLATION</b></p> <p>There are different vehicles compatible with this kit. For instance, some vehicle's fuel lines come from the RH side and some come from the LH side of the engine bay. Because of the variances, these instructions may slightly differ.</p> <p>Pictured is a general idea of how this plumbing kit will be installed.</p>					
	24	Oil Lubrication 8mm Allen Wrench Thread Locker	<p><b>20-1302-PK PLUMBING KIT INSTALLATION</b></p> <p>To get a 1:1 fuel pressure ratio (like OEM), install one of the 3 provided fittings (pictured) to the multi-port regulator (MPR) vacuum port.</p> <p><b>NOTES:</b></p> <ol style="list-style-type: none"> <li>1. Vacuum tubing is provided for the hose barb ONLY.</li> <li>2. Use a wicking thread lock, such as green Loctite.</li> <li>3. For a flat (non 1:1) fuel pressure, install the screw (not shown).</li> </ol>	 <p>3AN Adapter For specially-made 3AN hoses</p> <p>1/4" Push-To-Connect For 1/4" OD Semi-rigid tubing</p> <p>3/16" Hose Barb For 5/32" ID rubber hose</p>			
		25	Oil Lubrication 3/4" Wrench 1/4" Allen Wrench	<p><b>20-1302-PK PLUMBING KIT INSTALLATION</b></p> <p>As shown, install 2 of the 6AN ORB to 6AN male fittings (shown blue) to the upper MPR high pressure ports.</p> <p>Install the 6AN ORB plug (shown red) to the lower MPR low pressure return port, as shown.</p>			
			26	Oil Lubrication 3/4" Wrench 7/8" Wrench	<p><b>20-1302-PK PLUMBING KIT INSTALLATION</b></p> <p>As shown, install 1 of the 6AN ORB to 6AN male fittings (shown blue) to the lower MPR low pressure return port.</p> <p>Install the 8AN ORB to 8AN male fitting (shown orange) to the upper MPR high pressure port, as shown.</p>		
				27	PTFE Paste 11mm or 7/16" Wrench Vice	<p><b>20-1302-PK PLUMBING KIT INSTALLATION</b></p> <p>Apply plumber's paste to the tapered male 1/8" NPT threads on the gauge.</p> <p>Hand tighten the gauge to the inline 6AN adapter, then add 1.5-3 turns with a wrench.</p>	
					28	11/16" Wrench	<p><b>20-1302-PK PLUMBING KIT INSTALLATION</b></p> <p>Install the 6AN inline adapter gauge assembly to one of the 6AN MPR high pressure ports, as shown.</p>

29	4mm Allen Wrench	<b>20-1302-PK PLUMBING KIT INSTALLATION</b>	<p>Determine where the MPR will be installed. This location will be unique for every vehicle.</p> <p>NOTES:</p> <ol style="list-style-type: none"> <li>1. A pair of M6x1mm screws and nuts are included.</li> <li>2. The provided mounting bracket may or may not be needed.</li> <li>3. The MPR can be oriented in any direction including upside down.</li> </ol>	
	10mm Wrench			
30		<b>20-1302-PK PLUMBING KIT INSTALLATION</b>	<p>Provided are a mix of PushLok hose ends with different angles that will cover all unique applications. Temporarily thread the hose ends to the fuel rails and the MPR fittings (shown) that would fit best.</p> <p>Also, there are 8AN feed and 6AN return quick connect spring lock fittings provided. These will be installed after the hoses are assembled but take these into consideration for plumbing as well.</p>	
31	Oil Lubrication	<b>20-1302-PK PLUMBING KIT INSTALLATION</b>	<p>To assemble PushLok hose ends, lubricate the barbs and the inner walls of the hose. Apply excessive force until the hose bottoms out on the hose end. NOTE: hose clamps are not required for PushLok hose ends.</p> <p>A 3/8" (6AN) hose with a straight PushLok hose end is shown.</p>	
	Hose Cutter			
32	Oil Lubrication	<b>20-1302-PK PLUMBING KIT INSTALLATION</b>	<p>A 3/8" (6AN) hose with a 90 degree PushLok hose end is shown. A bench vice can sometimes be useful.</p>	
	Hose Cutter			
	Vice			
33	Oil Lubrication	<b>20-1302-PK PLUMBING KIT INSTALLATION</b>	<p>A 1/2" (8AN) hose with a straight PushLok hose end is shown.</p>	
	Hose Cutter			
34	Hose Cutter	<b>20-1302-PK PLUMBING KIT INSTALLATION</b>	<p>As previously mentioned, it can be easier to install the hose assembly to the quick connect spring lock fitting prior to installing the quick connect spring lock fitting to the OEM fuel lines.</p>	
	11/16" Wrench			
	Adjustable Wrench			

35	<p>Oil Lubrication</p> <p>20-1302-PK PLUMBING KIT INSTALLATION</p> <p>Lubricate the quick connect spring lock fitting O-rings.</p>	
36	<p>20-1302-PK PLUMBING KIT INSTALLATION</p> <p>Push on each quick connect spring lock fitting until they snap in place. Give each hose a tug to confirm they have locked in place.</p>	
37	<p>11/16" Wrench</p> <p>7/8" Wrench</p> <p>Cutters</p> <p>20-1302-PK PLUMBING KIT INSTALLATION</p> <p>Shown is the assembled 6AN hose from the MPR return port to the OEM return fuel line.</p> <p>When connecting the assembled 8AN hose from the OEM feed line to the MPR (not shown), cable zip ties are provided to secure the 2 lines together.</p>	
38	<p>11/16" Wrench</p> <p>20-1302-PK PLUMBING KIT INSTALLATION</p> <p>Confirm all hose ends are secure.</p>	
39	<p>20-1302-PK PLUMBING KIT INSTALLATION</p> <p>Remove the OEM fuel pressure regulator vacuum line (shown red).</p> <p>Push on the provided vacuum hose to the fuel pressure regulator vacuum port on the intake manifold, as shown.</p>	
40	<p>20-1302-PK PLUMBING KIT INSTALLATION</p> <p>Spin the MPR vacuum fitting to an ideal direction, as shown.</p>	

41	Hose Cutter	<p><b>20-1302-PK PLUMBING KIT INSTALLATION</b></p> <p>Cut the vacuum hose to length and install it to the MPR port.</p>	
42	10mm Socket	<p>Reconnect the battery. Cycle the keyed ignition switch ON/OFF a few times (without starting the engine). This allows the fuel pump to prime the system. Check for leaks.</p> <p>Prior to starting the engine, check with the installer/tuner to determine the desired fuel pressure. Alternatively, the MPR can be set to the previously recorded fuel pressure.</p> <p>Start the engine and check for leaks.</p>	
43		<p><b>20-1302-PK PLUMBING KIT INSTALLATION</b></p> <p>Turn the fuel pressure regulator knob (shown) clockwise to increase pressure and counterclockwise to decrease pressure. After the engine is fully warmed up, verify fuel pressure.</p> <p><b>INSTALLATION COMPLETE</b></p>	