



# INSTALLATION INSTRUCTIONS

## FUEL RAILS AND PLUMBING KIT

VW/AUDI/BENTLEY 6.0L W12

P/N: 20-0876

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ENGINEERING

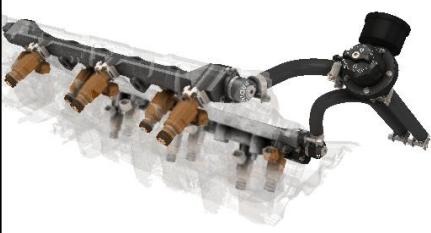
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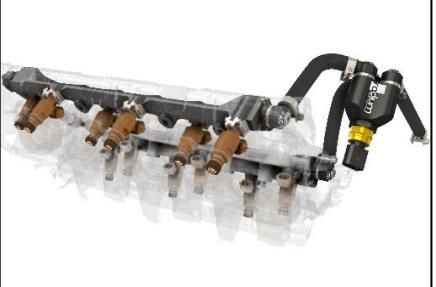
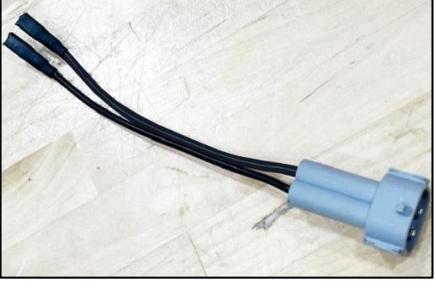
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CAUTION	
<p>Only a qualified technician following applicable safety procedures should perform the installation of this product. One must have knowledge in repair and modification of fuel systems and general vehicle modifications to install this product.</p> <p><b>Gasoline and other fuels are flammable and can be explosive.</b></p> <p>Only install in a well-ventilated location to minimize buildup of fuel vapors.</p> <p>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.</p> <p>Proper eye and personal protection is required at all times during installation.</p>	
WARNING	
<p>The fuel system is under pressure! Do not loosen any connections until relieving the fuel system pressure.</p> <p>Consult a service manual for instructions on relieving fuel pressure safely. This product is designed for off-highway and racing use only.</p> <p>Fuel system components may not be legal for sale or use on emissions controlled motor vehicles. Consult local, state, and federal laws.</p>	

STEP	TOOLS NEEDED	INSTRUCTIONS	PHOTO
1		<p>NOTES:</p> <ul style="list-style-type: none"> <li>a. These rails are compatible with many different models and engines.</li> <li>b. These fuel rails are not a complete bolt-in (plug and play) affair.</li> <li>c. In depth disassembly instructions are NOT covered.</li> <li>d. A factory Workshop Manual is recommended.</li> </ul>	<p><b>Bentley</b> <b>Continental Series</b> <b>WORKSHOP MANUAL</b></p> <p>2004-2010 <small>Bentley Continental Series Workshop Service Repair</small></p> 
		Temporarily remove the fuel pump fuse. Audi A8 fuse box shown.	
		Next, start the vehicle and allow the engine to stall. Reinstall the fuse and remove the key from the ignition switch.	
	10mm Socket	To disconnect the battery, remove the negative terminal. Bentley Continental GT shown.	
		CAUTION: Disconnecting the battery may cancel the fault memories of some control units.	
		Getting to the point where the upper intake manifold can be removed will be quite tedious. VW Phaeton W12 upper intake manifold shown.	
		Be sure to plug and protect the lower intake manifold ports.	

5	Pliers	<p>Late model W12 fuel rails only have a feed line. The FPR is in the tank.</p> <p>Early model W12 fuel rails have a feed line, return line, and a FPR (shown). For early model W12 fuel rails, carefully pull off the vacuum hose from the fuel pressure regulator (Bentley Continental GT shown).</p>	
6	Pliers Rag	<p>NOTE: For early model W12 engines, the white arrow on the hose denotes the feed. The blue arrow on the hose denotes the return.</p> <p>Prior to removing these lines make a note on which hard line is the feed and which is the return.</p> <p>Loosen all pinch clamps and pull each fuel hose off the barbs.</p> <p><b>WARNING: Fuel will spill.</b></p>	
7	5mm Allen Wrench	<p>Before unplugging the fuel injector connectors, each fuel rail will be unbolted and slightly lifted to gain access.</p> <p>Remove the mounting screws that secure the fuel rails to the cylinder heads (3 on each bank, 6 total). These screws will NOT be reused.</p>	
8	Rag	<p>To release the lower injector O-rings from the cylinder head, simply pull the fuel rails up slightly.</p> <p><b>NOTES:</b></p> <ol style="list-style-type: none"> <li>1. If an injector comes detached from a rail, fuel will spill out.</li> <li>2. Sometimes the lower O-ring will remain in the cylinder head. Pull it out of there and attach it back to the injector.</li> </ol> <p>As shown, rotate the fuel rails to access the injector connectors.</p>	
9	Pick	<p>To free the fuel injector connectors, carefully squeeze and pull to release. <b>CAUTION:</b> Be careful as the plastic is very brittle.</p> <p>Shown are the fuel injector connectors from cylinders: 9-12.</p>	
10	Rag	<p>Bring the OEM fuel rails to a clean workbench.</p> <p><b>NOTE:</b> Late model W12 fuel rails are shown.</p>	

11	<p>Rag</p> <p>To unlock the injectors, pry off the 12 metal retaining clips from the rails. These will be reused. <b>WARNING:</b> fuel will spill out of the ports.</p> <p>Pull the injectors from the fuel rails. Inspect the injector O-rings and replace if necessary.</p> <p>NOTE: Early model W12 fuel rails (shown) have a return line and a fuel pressure regulator.</p>	
12	<p>24mm Wrench</p> <p>18mm Wrench</p> <p>NOTE: The fuel pressure sensor threads are M10x1mm.</p>	
13	<p>NOTES:</p> <ol style="list-style-type: none"> <li>Each fuel rail uses two 3/8" (6AN) bores that connect to all injectors. Combined, these bores are 12% larger than a single 1/2" (8AN) bore.</li> <li>The fuel rail end caps come preassembled.</li> <li>There is an internal O-ring for each end cap.</li> <li>If the end caps are ever removed, there is a RH and a LH side.</li> <li>The threaded ports on the end caps are 8AN ORB (3/4"-16).</li> </ol>	
14	<p>Adapter fittings will need to be purchased separately. For a plethora of options, go to <a href="http://radiumauto.com">radiumauto.com</a> and click on the 8AN ORB fittings product page. <b>NOTE:</b> Be sure to lubricate the O-rings (shown) prior to installation.</p> <p>When choosing the adapters fittings for the specific vehicle, reference the following steps for fuel plumbing ideas.</p>	<p><b>8AN ORB</b></p> 
15	<p>Shown is an example of how the fuel rails could be plumbed with an early model W12 fuel system that uses a return line with a fuel pressure regulator.</p>	
16	<p>Shown is another angle for plumbing a W12 return system.</p>	

17	<p>Shown is a example of how the fuel rails could be plumbed with a late model returnless W12 fuel system that uses a fuel pressure sensor.</p>	
18	<p>Shown is another angle for plumbing a W12 returnless system.</p>	
19	<p>Insert the OEM metal clips into the top groove of the fuel injectors. Be sure the clips are oriented in the direction depicted.</p>	
20	<p><b>Oil Lubrication</b> For ease of installation, lubricate the injector O-rings, cylinder head injector ports, and the fuel rail injector bores.</p> <p>Fully insert the injectors into the fuel rail bores in the orientation shown. Confirm the OEM metal injector clips locked into place.</p> <p><b>NOTE:</b> With these high flow fuel rails, the injector connectors must all face the same direction in each fuel rail. This will create a few installation challenges discussed below.</p>	
21	<p>Depending on the fuel injector type, there might be a connector interference when attempting to push down the fuel rail past the lower intake manifold. This will affect the inner injectors (Cylinder Numbers: 2, 4, 6, 7, 9, 11).</p> <p>As shown, simply turn the fuel injector connector to one side to get it past the lower intake manifold flange.</p>	
22	<p>Depending on the physical fuel injector type, there might be an interference with the factory injector harness connectors.</p> <p>If this is the case, purchase Radium Engineering P/N: 17-0065 Denso injector connector adapters (shown) for each fuel injector of concern.</p>	

23	<p>To install 17-0065, 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> <p>Move the 17-0065 injector plugs into an ideal location for reconnecting the OEM wire harness, as shown.</p>	
24	<p>5mm Allen Wrench</p> <p>Push the fuel rails downward to fully seat the injectors into the cylinder head ports. Once everything is positioned correctly, secure each fuel rail using the provided M6x1mm socket head screws.</p> <p>NOTE: As shown, only 3 screws are used for each fuel rail. Nothing is used in the other 2 fuel rail holes.</p>	
25	<p>As shown, temporarily reinstall the upper intake manifold. Check clearance with the new larger fuel rails.</p>	
26	<p>Depending on which upper intake manifold is installed, there may be areas that will need to be altered. This may require removing OEM components (as shown) or filing/grinding down the manifold in specific locations.</p>	
27	<p>Once confirmed, permanently install the upper intake manifold.</p> <p>Plug in the fuel injector connectors (cylinder #2 shown).</p> <p>Plumb the fuel rails to the vehicle. NOTE: This is not covered as there are multiple vehicles that use the W12 engine. Some are naturally aspirated and some are twin turbocharged.</p>	
28	<p>10mm Wrench</p> <p>Reinstall everything in reverse order. Reconnect the battery.</p> <p>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>Start the engine and confirm again while the engine is running.</p> <p><b>INSTALLATION COMPLETE</b></p>	