



INSTALLATION INSTRUCTIONS

FUEL RAIL AND PLUMBING KIT

VOLKSWAGEN 2.8L 24V VR6

P/N: 20-0878

Document: 9-0366
Support: info@radiumauto.com

COLOR LEGEND FOR EACH STEP
20-0878 FUEL RAIL, VW 2.8L 24V VR6
 Follow **ORANGE** areas
20-0878-PK FUEL RAIL PLUMBING KIT
 Follow **YELLOW** areas

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.


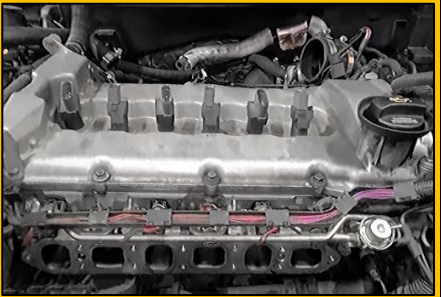


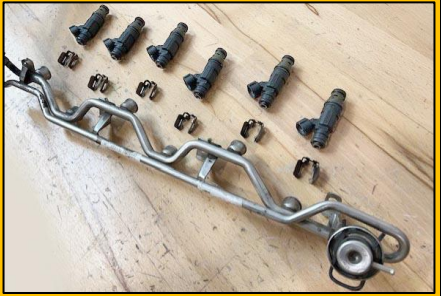

Only install in a well-ventilated location to minimize buildup of fuel vapors.

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.

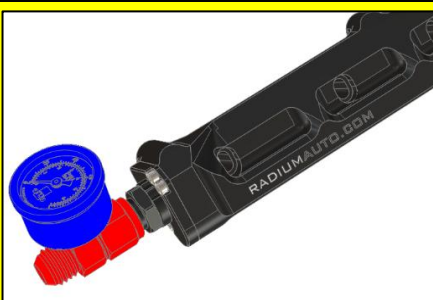





WARNING

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.



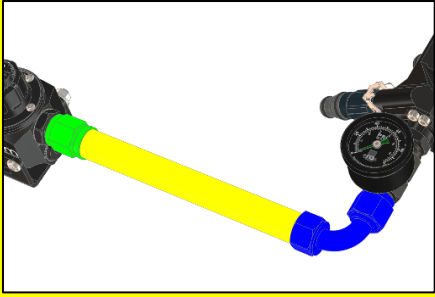
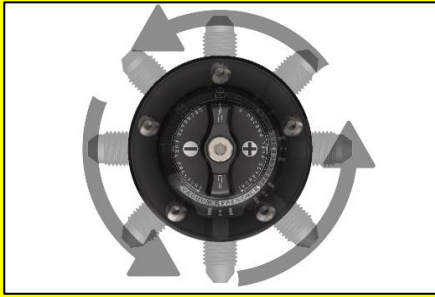


| STEP | TOOLS NEEDED | INSTRUCTIONS | PHOTO |
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| 1 | | NOTES: a. This fuel rail is compatible with many different models and engines. b. In depth disassembly instructions are NOT covered. c. A factory Workshop Manual is recommended. | |
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| 2 | | First, the fuel system will need to be depressurized. Temporarily remove the 15A fuel pump fuse from the fuse box. Next, start the vehicle and allow the engine to stall. Reinstall the fuse and remove the key from the ignition switch. | |
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| 3 | 10mm Socket | To disconnect the battery, remove the negative terminal (as shown). CAUTION: Disconnecting the battery may cancel the fault memories of some control units. | |
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| 4 | | Getting to the point where the intake manifold can be removed will be quite tedious. Shown is the intake manifold removed from the vehicle. | |
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| 5 | Pliers | <p>Pull the feed line and return line out of the valve cover clips. Note which fuel line is the feed (denoted with white arrow and connector) and which is the return (denoted with a blue arrow and connector).</p> <p>At the fuel rail, loosen the pinch clamps and move them up the hoses, as shown. Now pull each hose off the fuel rail barbs. At the firewall, squeeze the locks on the SAE quick connectors and pull up to release. WARNING: Fuel will spill.</p> |  |
| | Rag | | |
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| 6 | | <p>Carefully pull off the vacuum hose from the fuel pressure regulator (FPR).</p> |  |
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| 7 | | <p>Pull the main injector wire harness up out of the clips. Rotate all 6 fuel injectors to access the electrical plugs. To free the connectors, carefully squeeze the locking tabs and simultaneously pull to release.</p> <p>CAUTION: Be careful as these connectors can be very brittle.</p> |  |
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| 8 | 5mm Allen Wrench | <p>Remove the 4 mounting screws that secure the fuel rail to the cylinder head. NOTE: These OEM screws will NOT be reused.</p> <p>To separate the lower injector O-rings from the cylinder head, simply pull the fuel rail up and away. NOTE: if by chance a fuel injector comes detached from the rail instead, be ready for fuel to spill out.</p> |  |
| | Rag | | |
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| 9 | Rag | <p>Bring the OEM fuel rail assembly to a clean workbench.</p> <p>To unlock the injectors, pry off the 6 metal retaining clips from the rail. These will be reused. WARNING: fuel will spill out of the ports.</p> <p>As shown, pull the 6 injectors from the fuel rail. Inspect the injector O-rings and replace if necessary.</p> |  |
| | Pick | | |
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| 10 | | <p>The fuel rail uses two 3/8" (6AN) bores that connect to all 6 injectors. Combined these bores are 12% larger than a single 1/2" (8AN) bore.</p> |  |
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| 11 | | <p>NOTES:</p> <ol style="list-style-type: none"> 1. The fuel rail end caps come preassembled. 2. There is an internal O-ring for each end cap, as shown. |  |
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| 12 | | <p>NOTES:</p> <ol style="list-style-type: none"> 1. If the fuel rail end caps are ever removed, note that there is a RH and a LH side. 2. The threaded ports on the end caps are 8AN ORB (3/4"-16). |  |
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| 13 | Oil Lubrication | <p>A complete Radium plumbing kit is sold separately. If this was purchased, follow these instructions starting from the next step.</p> <p>If the plumbing kit was not purchased, adapter fittings will need to be purchased separately. For a plethora of options, go to radiumauto.com and click on the 8AN ORB fittings product page.</p> <p>NOTE: Be sure to lubricate the O-rings (shown) prior to installation.</p> | <p>8AN ORB</p>  |
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| 14 | Oil Lubrication | <p><u>20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6</u></p> <p>Lubricate the O-ring and install the provided 8AN ORB plug (shown yellow) to the LH side fuel rail port.</p> |  |
| | 5/16" Allen Wrench | | |
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| 15 | Oil Lubrication | <p><u>20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6</u></p> <p>Lubricate the O-ring and install the provided 8AN ORB to 8AN male fitting (shown green) to the RH side fuel rail port.</p> |  |
| | 7/8" Wrench | | |
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| 16 | PTFE Paste | <p><u>20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6</u></p> <p>Find the fuel pressure gauge (shown blue) and the 8AN female to 8AN male fitting (shown red) in the kit.</p> <p>Apply PTFE paste to the male 1/8" NPT threads on the gauge. Hand tighten the gauge, then add 1.5 to 3 turns with a wrench.</p> |  |
| | 7/16" or 11mm Wrench | | |
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| 17 | 7/8" Wrench | 20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6 |  |
| | | Install the 8AN female to 8AN male fitting (shown red) to the RH side fuel rail fitting. Before tightening, rotate the fitting so the fuel pressure gauge (shown blue) is pointing upwards. | |
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| 18 | | 20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6 |  |
| | | Install 1 of the 4 fittings to the multiport regulator (MPR) vacuum port. All fittings (excluding the push-to-connect) require a wicking thread locker, such as green Loc-Tite 290. | |
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| 19 | Oil Lubrication | 20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6 |  |
| | 3/4" or 19mm Wrench | Lubricate the O-ring and install the provided 6AN ORB to 6AN male fitting (shown yellow) to the lower MPR return port. | |
| | 5/16" Allen Wrench | | |
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| 20 | Oil Lubrication | 20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6 |  |
| | 7/8" Wrench | Lubricate the O-ring and install the provided 8AN ORB to 8AN male fitting (shown yellow) to the upper MPR outlet port. | |
| | 5/16" Allen Wrench | | |
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| 21 | 4mm Allen Wrench | 20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6 |  |
| | 10mm Socket Wrench | Find a location to mount the MPR using the M6x1mm hardware. | |
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| 22 | Oil Lubrication | 20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6 |  |
| | | A 6AN hose will be constructed between the male SAE quick connect return line near the firewall and the MPR return fitting. | |
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| | | Find the 3/8" EFI hose and one of the 6AN pushlok hose ends in kit. Lubricate the pushlok barbs and fully seat the hose end into the hose. NOTE: clamps are not required for pushloks. | |
| | | Temporarily install the hose end to the MPR return fitting. | |

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| 23 | Oil Lubrication | 20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6 |  |
| | Hose Cutter | Lubricate the internal O-rings of one of the SAE quick connectors (green) in the kit and temporarily install it to the OEM return hard line. Line up the 3/8" hose (yellow) and cut it to length. Slide the EFI clamp (red) over the hose. Lubricate the SAE quick connector barbs and fully seat into the hose. Secure the EFI clamp. | |
| | Screwdriver | | |
| | 11/16" Wrench | | |
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| | | Permanently install the 3/8" return hose to their respective fittings. | |
| 24 | Oil Lubrication | 20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6 |  |
| | | A 6AN hose will be constructed between the male SAE quick connect feed line near the firewall and the MPR feed port fitting. | |
| | | Grab the leftover 3/8" EFI hose and the other 6AN pushlok hose end. Lubricate the pushlok hose end barbs and fully seat it into the hose. NOTE: clamps are not required for pushloks. | |
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| | | Temporarily install the hose end to the MPR feed port fitting. | |
| 25 | Oil Lubrication | 20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6 |  |
| | Hose Cutter | Lubricate the internal O-rings on the other SAE quick connector (shown green) and temporarily install it to the OEM feed hard line. Line up the 3/8" hose (shown yellow) and cut it to length. Slide the EFI clamp (shown red) over the hose. Lubricate the SAE quick connector barbs and fully seat it into the hose. Secure the EFI clamp. | |
| | Screwdriver | | |
| | 11/16" Wrench | | |
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| | | Permanently install the 3/8" feed hose to their respective fittings. | |
| 26 | | Insert the OEM metal clips into the top groove of the fuel injectors. |  |
| | | Be sure they are oriented in the direction depicted. | |
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| 27 | Oil Lubrication | For ease of installation, lubricate the injector O-rings, cylinder head injector seats, and the fuel rail injector bores. |  |
| | | Fully insert the injectors into the fuel rail bores in the orientation shown. Confirm the OEM metal injector clips locked into place. | |
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| 28 | 5mm Allen Wrench | Line-up and place the fuel rail assembly onto the cylinder head. Push the fuel rail downwards to fully seat the injectors into the ports. |  |
| | | Once everything is positioned correctly, secure the fuel rail using the 2 provided M6x1mm socket head screws, as shown. | |
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| | | Install the fuel injector connectors. | |
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| 29 | | Temporarily reinstall the intake manifold. Verify the fuel injector connector clearances as these will be close. |  |
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| | | Now plumb the rail to your fuel system. NOTE: This is not covered in this manual unless the optional plumbing kit was purchased. | |
| 30 | Oil Lubrication | 20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6 An 8AN hose will be constructed between the MPR outlet port fitting and the fuel rail inline adapter fitting. |  |
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| | | Find the 1/2" EFI hose and the straight 8AN pushlok hose end in kit. Lubricate the pushlok hose end barbs and fully seat it into the hose. Temporarily install the straight hose end to the MPR outlet port fitting. NOTE: clamps are not required for pushlocks. | |
| 31 | Oil Lubrication | 20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6 |  |
| | Hose Cutter | Temporarily install the 90 deg 8AN pushlok hose end (blue) to the fuel rail inline adapter fitting. Line up the 1/2" hose (yellow) and cut it to length. Lubricate the 90 degree 8AN pushlok barbs and fully seat it into the hose. NOTE: clamps are not required for pushlocks. | |
| | 7/8" Wrench | | |
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| | | Permanently install the 1/2" fuel rail hose to their respective fittings. | |
| 32 | Hose Cutter | 20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6 |  |
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| | | Spin the MPR vacuum fitting to an ideal direction, as shown. If applicable, install the provided vacuum hose to the MPR port. Now route it to the intake manifold port. Be sure to stay away from hot areas and moving components. Cut the vacuum hose to length and install it to the intake manifold port. | |
| 33 | 10mm Wrench | After everything is reinstalled, reconnect the battery. |  |
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| | | 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. | |
| 34 | | Start the engine and confirm again while the engine is running. |  |
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| | | 20-0878-PK FUEL RAIL PLUMBING KIT, VW/AUDI 2.8L 24V VR6 The static fuel pressure of the 2.8L 24V VR6 engine is 3 bar (43.5psi). To properly calibrate, temporarily disconnect the vacuum line from the MPR and plug the vacuum hose. Turn the MPR knob (shown) clockwise to increase pressure and counterclockwise to decrease pressure. Once target pressure is achieved, reconnect the vacuum hose. After the engine is fully warmed up, verify fuel pressure. INSTALLATION COMPLETE | |