INSTALLATION INSTRUCTIONS

TOYOTA 2UZ-FE NON VVT-I FUEL RAILS

P/Ns: 20-0962 & 20-0964

Document: 19-0372

Support: info@radiumauto.com

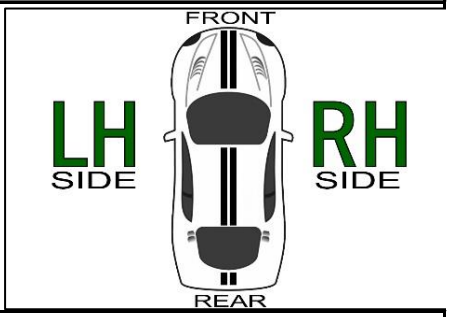
COLOR LEGEND FOR EACH STEP
GENERAL INSTALLATION
Follow WHITE areas below
20-0962 FUEL RAIL INSTALLATION
Follow ORANGE areas below
20-0964 PLUMBING KIT INSTALLATION
Follow YELLOW areas below
ENGINE MODEL DIFFERENCES
Follow DARK YELLOW areas below

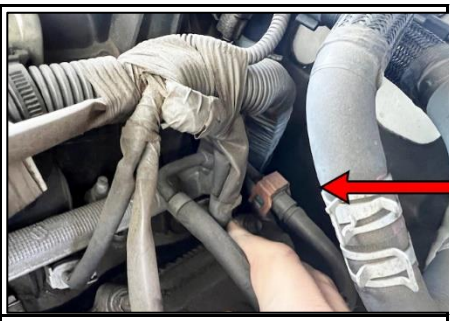
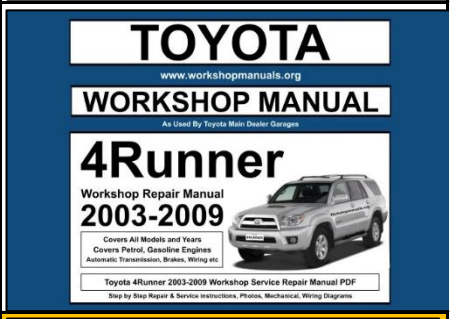
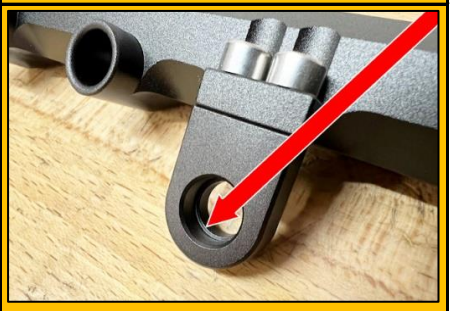
CAUTION

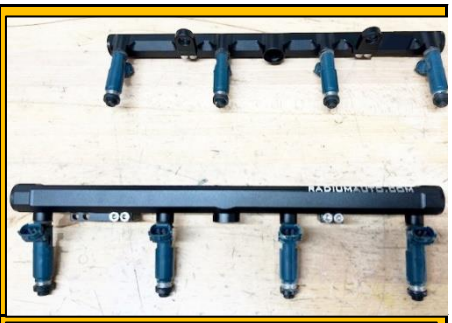
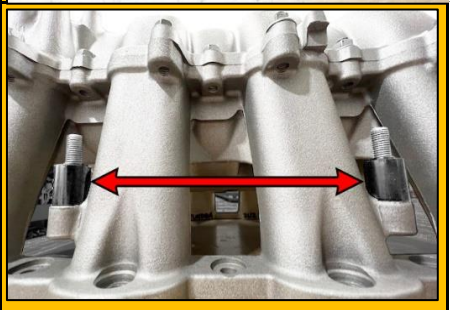
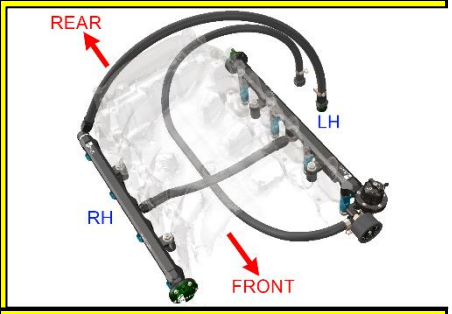
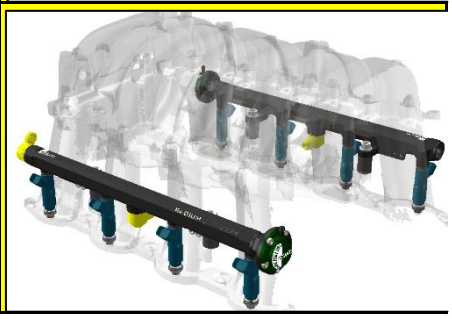
Only a qualified technician following applicable safety procedures should perform the installation of this product.
One must have knowledge in repair and modification of fuel systems and general vehicle modifications to install this product.
Gasoline and other fuels are flammable and can be explosive.
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.

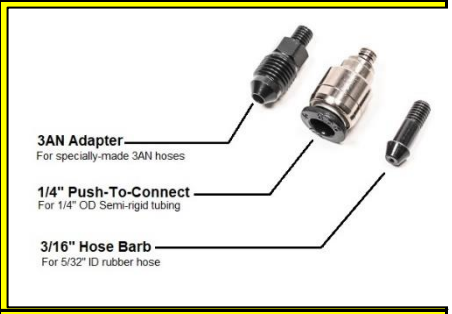
WARNING

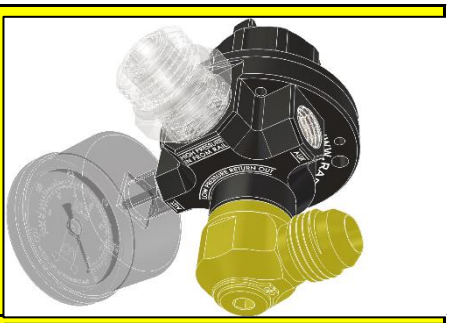
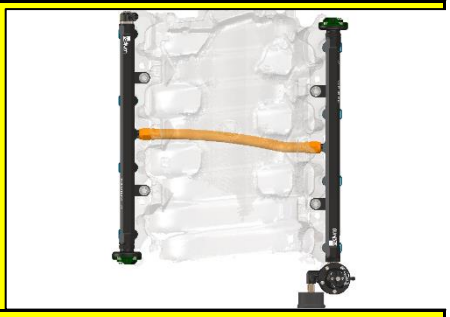
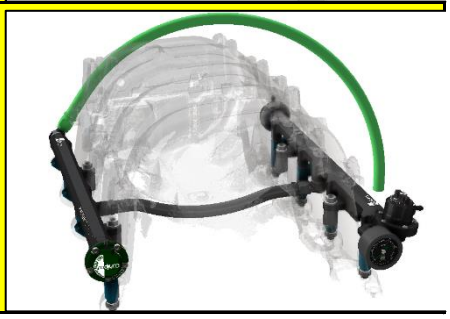
The fuel system is under pressure! Do not loosen any connections until relieving the fuel system pressure.
Consult a service manual for instructions on relieving fuel pressure safely. This product is designed for off-highway and racing use only.
Fuel system components may not be legal for sale or use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

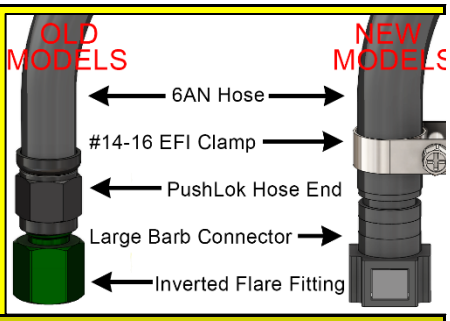
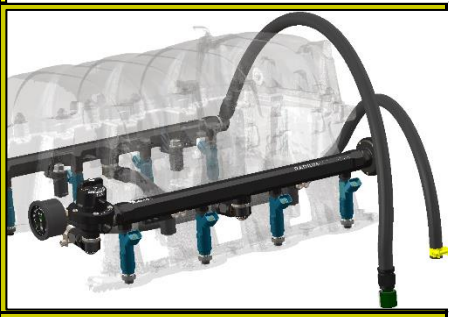
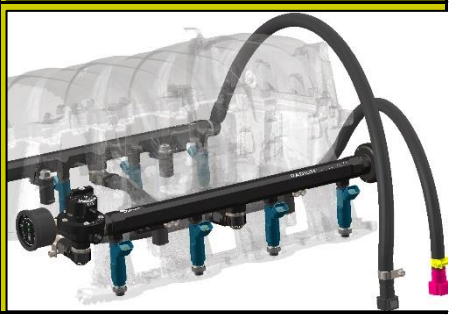
STEP	TOOLS NEEDED	INSTRUCTIONS	PHOTO
1		a. The terms "driver-side" and "passenger-side" will NOT be referenced. These instructions will reference "LH" and "RH" areas of the vehicle. c. Aluminum wrenches are recommended to prevent surface marring. d. Lubricate all O-rings with engine oil prior to installation. 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.	
2	10mm Socket Wrench	First, turn OFF the ignition and disconnect the battery. CAUTION: Disconnecting the battery may cancel the fault memories of some control units.	
3	10mm Socket	Remove the engine cover and LH cover (if applicable).	
4	14mm Flare Nut Wrench 19mm Wrench	Disconnect the fuel line that attaches the chassis feed line to the rails. For early model engines, wrenches will be required. For late model engines, first flip up the plastic safety cover. Next, squeeze the locking tabs on the sides of the SAE quick connector and simultaneously pull to release, as shown.	

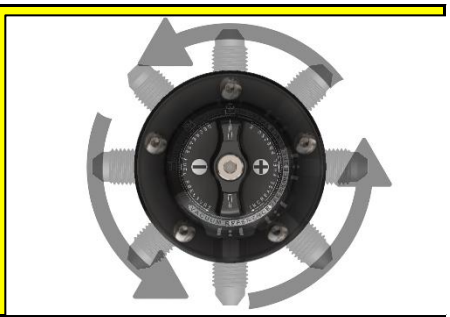
5	Pliers	Disconnect the return hose that attaches to the chassis fuel line. For early model engines, pliers will be required. For late model engines (shown), first flip up the plastic safety cover. Next, squeeze the locking tabs on the sides of the SAE quick connector and simultaneously pull to release.	
6		Because of the various compatible vehicles, removal of specific parts will not be covered. It is recommended to have a factory Workshop Service Manual.	
7	Rag	**20-0962 FUEL RAIL INSTALLATION** NOTES: 1. The OEM M8x1.25mm flanged nuts will be reused. 2. For aluminum 2UZ-FE (Non VVT-i) intake manifolds, leave the 4 factory thermal insulating spacers on the OEM M8x1.25mm studs. When removing the injectors from the fuel rails, have a rag handy.	
8	4mm Allen Wrench	In the next step, the included mounting feet will be installed to the fuel rails. However, they must be positioned so the machined internal "step" is visible from underneath, as shown. This is necessary for proper mating with the OEM thermal insulating spacers.	
9	4mm Allen Wrench	As depicted, be sure not to mistakenly use the extra outer mounting location shown.	
10	Oil	Unless the plumbing kit was purchased (described in the section below), adapter fittings are NOT included. Each fuel rail has three 8AN ORB (3/4"-16) ports. Go to www.radiumauto.com to find an array of compatible adapter fittings, fuel pressure regulators, pulse dampers, etc. that can be used. NOTE: Lubricate the O-rings prior to installation.	

11	Oil	For ease of installation, lubricate the injector O-rings, intake manifold injector seats, and fuel rail injector bores. Fully insert the injectors into the fuel rail bores, as shown.	
12		Confirm all 4 OEM thermal insulating spacers are installed to the intake manifold studs, as shown.	
13	12mm Socket	Line-up and place the fuel rail assemblies onto the intake manifold. Once everything is positioned correctly, push the fuel rails downward to fully seat the injectors. The aluminum 2UZ-FE (NON VVT-I) intake manifold is shown. Notice the front RH fuel rail mounting foot location. Orient the fuel injectors so the connectors can be plugged in.	
14		**20-0964 PLUMBING KIT INSTALLATION** Because there are different vehicles compatible with this kit, these specific instructions may slightly differ. The picture shown is a general idea of how this plumbing kit will be installed. 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.	
15	Threadlocker 1/8" Allen Wrench	Prior to installing the fuel pulse dampers (FPDs), fittings need to be installed into the FPD vacuum ports. Unless fuel pressure will exceed 70psi, install the small screws to plug the ports for naturally aspirated engines. For engines with forced induction, install the barbs (shown) in the FPD ports by hand. Use a wicking thread lock, such as green Loctite.	
16	Oil Lubrication 22mm Wrench 4mm Allen Wrench	As shown, install one fuel pulse damper into the front RH port and the other fuel pulse damper into the LH rear port. Install the 8AN ORB to banjo swivel 6AN male fittings (shown yellow) into the each fuel rail center port and into the RH rear fuel rail port.	

17	Threadlocker 1/8" Allen Wrench	If the engine did not use a fuel rail mounted FPR (fuel pressure regulator), the FPR in the fuel tank will need to be blocked off. This process is NOT discussed in this manual. Furthermore, these engines are tuned for a "flat" fuel pressure from the factory. To mimic this flat fuel pressure, screw the plug (shown) into the vacuum port. A vacuum line is not required. NOTE: Use a wicking thread lock, such as green Loctite.	
18	Oil Lubrication 8mm Allen Wrench	The majority of engines use a fuel rail mounted FPR. To get a 1:1 fuel pressure ratio, install one of the other provided fittings to the FPR vacuum port. NOTES: 1. Vacuum tubing is provided for the hose barb ONLY. 2. Use a wicking thread lock, such as green Loctite.	
19	Oil Lubrication 8mm Allen Wrench	Install the 8AN ORB to 6AN ORB fitting (shown blue) to the direct mount regulator inlet port. Temporarily spin the FPR onto the front LH fuel rail port.	
20	PTFE Paste 15mm Wrench	Determine which 1/8" NPT side port will be ideal for the fuel pressure gauge. Also, determine if the provided 1/8" NPT male to female elbow will be needed. Apply plumber's paste to the tapered male 1/8" NPT threads on the elbow (shown orange). Thread the elbow onto the appropriate FPR port. Hand tighten the NPT threads, then add 1.5-3 turns with a wrench.	
21	PTFE Paste 11mm or 7/16" Wrench	Apply plumber's paste to the tapered male 1/8" NPT threads on the gauge (shown green). Hand tighten the NPT threads, then add 1.5-3 turns with a wrench.	
22	PTFE Paste 3/16" Allen Wrench	Apply plumber's paste to the tapered 1/8" NPT plug threads. Hand tighten the plug (shown red) to the FPR side port. Now add 1.5-3 turns with a wrench.	

23	Oil Lubrication 4mm Allen Wrench	Install the 6AN ORB to 6AN male swivel fitting (shown yellow) to the bottom FPR port.	
24	Oil Lubrication 22mm Wrench	Install the FPR (shown pink) to the front LH fuel rail port.	
25	Oil Lubrication Vice	For the crossover hose, first temporarily thread one of the PushLok hose ends (shown orange) to one of the center port fittings. Next, find another PushLok hose end in the kit. Lubricate the barbs and the inner walls of the 3/8" (6AN) hose. Apply excessive force until the hose bottoms out on the hose end. NOTE: hose clamps are not required for PushLok hose ends.	
26	Marker	Send the partially assembled hose underneath the manifold and loosely thread the hose end to the opposing center port fitting. Mark the hose (shown blue) to the appropriate cut length.	
27	Oil Lubrication Hose Cutter Vice 11/16" Wrench	Remove both PushLok hose ends from the center ports and bring them to a workbench. Cut the 3/8" (6AN) hose at the marked area. Lubricate the loose PushLok hose end barbs and inner walls of the hose. Apply force until the hose bottoms out on the hose end. NOTE: hose clamps are not required for PushLok hose ends. As shown, secure the assembled hose to the center fuel rail ports.	
28	Oil Lubrication Vice	Find another PushLok hose end in the kit. Lubricate the barbs and the inner walls of the leftover 3/8" (6AN) hose. Apply excessive force until the hose bottoms out on the hose end. NOTE: hose clamps are not required for PushLok hose ends. Loosely thread the partially assembled hose (shown green) to the rear RH fuel rail port. As shown, the banjo swivel fitting will likely need to be rotated upwards to clear the intake manifold.	

29		There are 2 different types of OEM hose connections. 1. Early model engines use a flare requiring the green flared fitting. 2. Late model engines use an SAE quick connector. For this connection, be sure to use the one with the larger barbs (not the smaller barbs). Shown are both types. Depending on the engine, some parts in the plumbing kit will NOT be used.	
30	14mm Flare Nut Wrench 19mm Wrench Marker Hose Cutter Vice 11/16" Wrench Oil Lubrication	**Early Model Engines ONLY** Carefully secure the included inverted flare fitting (shown green) to the OEM feed line. Loosely thread another PushLok hose end (shown red) to the flare fitting. Mark the hose. Remove both hose ends. Cut the 3/8" (6AN) hose at the marked area. Lubricate the hose end. Apply force until the hose bottoms out on the hose end. NOTE: hose clamps are not required for PushLok hose ends. As shown, secure the new assembled feed hose.	
31	Oil Lubrication Hose Cutter Screwdriver	**Late Model Engines ONLY** There are two different type SAE quick connect fittings provided in the kit. Find the SAE quick connect fitting (shown yellow) with the larger barbs. Carefully push onto the OEM feed line. Mark and cut the 3/8" (6AN) hose. Slide the #14-16 EFI hose clamp (shown pink) over the hose. Lubricate the SAE quick connect fitting barbs and slide on the hose. As shown, secure the new assembled feed hose.	
32	11/16" Wrench Screwdriver	Install the 6AN female to 5/16" barbed fitting (shown orange) to the lower FPR return port. Install the 5/16" (5AN) hose (shown green) to the FPR return barb. Secure the hose using the provided #13-15 EFI hose clamp (shown red). Route the hose under the intake manifold and towards the rear.	
33	Hose Cutter Screwdriver	**Early Model Engines ONLY** There are 2 different return hose connection types. Early model engines use a simple barb. Some parts in the kit will NOT be used. Route the return hose for best fitment and cut to length. Slide the provided #13-15 EFI hose clamp (shown yellow) onto the hose. Carefully push the hose onto the factory return line barb and secure.	
34	Oil Lubrication Hose Cutter Screwdriver	**Late Model Engines ONLY** There are 2 different return hose connection types. Late model engines use a quick connect. Some parts in the kit will NOT be used. Push the small barbed SAE quick connect (shown pink) onto the OEM return line. Route the return hose for best fitment and cut to length. Slide the provided #13-15 EFI hose clamp (shown yellow) onto the hose. Lubricate the SAE quick connect barbs and carefully push on the hose. To secure the hose, tighten the EFI clamp.	

35		If needing a 1:1 vacuum reference, spin the FPR fitting to an ideal direction, as shown. Install a vacuum hose to the intake manifold. If needing a 1:1 vacuum reference on the FPDs, spin the fittings to ideal directions. Using the provided vacuum hose and "Y" fittings, install the vacuum hose to the respective intake manifold ports.	
36	10mm Socket	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. Prior to starting the engine, check with the installer/tuner to determine the desired fuel pressure. Alternatively, the FPR can be set to the previously recorded fuel pressure. Start the engine and check for leaks.	
37		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. After all leaks are cleared, reinstall the engine cover(s). **INSTALLATION COMPLETE**