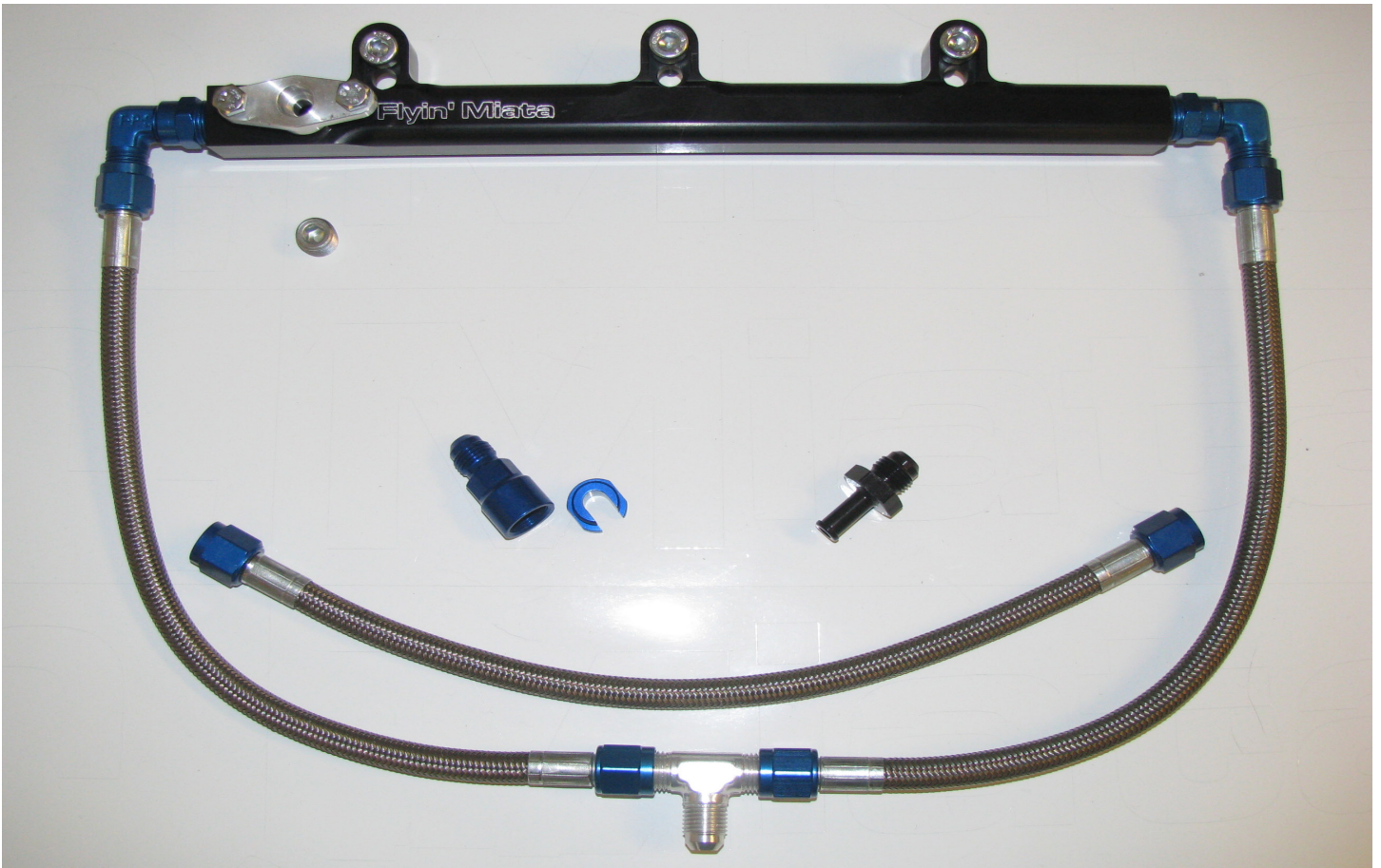


Flyin' Miata

Fuel Rail Kit 04-46550



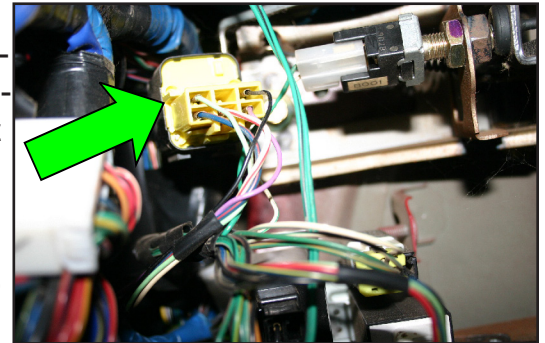
Congratulations on purchasing the FM Fuel Rail! We're confident that this high quality kit will help ensure the safety and performance of the engine in your Miata. Following are instructions that will help you safely install this kit. Please call or email us if you have installation questions. Our number and email are below.

WARNING: Not everyone can perform every installation. It is critical that you be honest with yourself, in regards to your ability. We're more than happy to help, but there are only so many things we can do from the other end of a phone / computer. If in doubt, discuss the install with us before you dive in. Improper installation could cause injury and / or death!

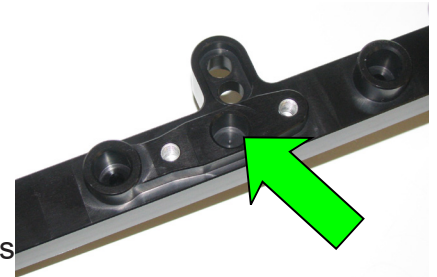
Required tools:

- **10,12mm sockets**
- **Ratchet Socket Wrench**
- **Pliers**
- **Shop rags**
- **Bucket or drain pan**
- **Fuel safe thread paste**

1. The fuel system first needs to have its pressure relieved. First, find the relay that's pictured to the side. It will be underneath the dash, near the steering column. It should look similar to the relay in the picture, but different years had different relays, so it might not be exactly the same. Look for a blue wire with a red stripe on a '90 - '97 car, or a red wire with a blue stripe on a '99 - '05; that's the wire that goes to the fuel pump. Start the car and let it idle. While the car is idling, unplug the relay. This will kill the engine, as it's no longer being fed the fuel it needs. Crank the engine a few times to ensure that the pressure has been relieved, then turn the car off. Remove the gas cap as well, to ensure that pressure doesn't build up in the tank. Don't reinstall it until the fuel rail is fully installed.
2. Disconnect the negative terminal for the battery. You'll be working near the starter, and you don't want to accidentally touch one of the stainless steel lines to the lead on the starter. That will get dramatic in a hurry.
3. **'90 - '97 cars only:** Remove both of the rubber fuel lines from the metal hard lines. Fuel will spill out from these lines, so try to have something to catch the spillage. These can be a pain to remove, try twisting the rubber line to break the adhesion between the rubber and metal lines. It's also a good idea to try to drain as much as possible from the lines, this will make the rest of the mess smaller.
4. **'99 - '05 cars only:** Slip the included fuel line tool (cylindrical grey plastic piece) over the metal line, then push it up, into the fuel fitting. The fuel line should then pull off with a small tug.
5. **'99 - '05 cars only:** The upper intake manifold needs to be removed. There are eight ('99 - '00) or seven ('01 - '05) bolts that need to be removed to allow the two pieces to separate. Two of these bolts are below the throttle body. Be sure to remove any of the hoses and such that will prevent the top half from being lifted off. Make a note of where all of the lines go, so you're sure to put them back in the right places. Once these have been removed, tilt the top half forward and out of the way. Be careful of the various lines going to the throttle body. While they can remain attached, you need to make sure that they don't get kinked. Also put rags in the open holes, to ensure that nothing accidentally falls down there.
6. **'90 - '97 cars only:** Remove the hoses from the fuel pressure regulator (FPR). There will be a fuel line and a vacuum line.
7. Remove the FPR ('90 - '97 cars) / damper ('99 - '05 cars) from the fuel rail. Set this aside with its bolts, they'll all be reused. This can be removed after the rail is off of the engine, if that's easier.
8. Remove the bolts that hold the fuel rail in. There are small black plastic spacers that these bolts go through, they're below the fuel rail. These are very easy to lose and very hard to find once lost, so be careful with them. Gently pull the rail off of the fuel injectors. There are also four small black rubber rings that the bottom of the injectors sit in, be careful not to lose these either. Remove the rail and hoses from the car.



9. Now it's time to move onto the new parts! First, be sure that there is nothing inside of the fuel rail or lines. You should spray them out with brake cleaner or carb cleaner, just to be sure they're completely clean.
10. NPT guidelines: Use fuel-safe thread paste - we don't recommend thread tape due to the possibility of a piece getting into the fuel system - on all but the last two threads of the fittings. You don't need much, but it's better to use too much than too little. As with all NPT (tapered) threads, the fittings will get tight without appearing to bottom out on anything. This is normal, don't overtighten.
11. **'90 - '93 cars only:** Smear some oil on the O-ring on the FPR and bolt it into the new fuel rail using the new M6 bolts (36-10401). Be sure the fuel outlet points down / away from the engine.
12. **'94 - '97 cars only:** The FPR must be mounted to the adapter on top. The location in the bottom will not allow for proper fitment. Install the adapter into the threaded hole on top of the rail, being sure to follow the NPT guidelines in step 10. Be sure the orientation of the adapter will allow for proper fitment of the FPR. Smear some oil on the O-ring on the FPR, then bolt it into the adapter using the new M6 bolts (36-10401). Pay attention to its orientation within the adapter as well.
13. **'99 - '05 cars only:** If the car no longer has an EGR valve on the intake manifold, you can mount the damper on the top or on the bottom. If you mount the damper on top, please follow the 94-97 directions - don't follow anything else in this step. Just read "FPR" in the 94 - 97 directions as "damper". If the car still has the EGR valve installed, it **MUST** be installed on the bottom. If you mount it on the bottom, you'll need to plug the hole on top. Follow the NPT guidelines from step 10. On the bottom of the rail, drill a 1/4" hole in the location indicated in the picture. To drill the hole, center-punch the middle of the large hole, then wrap tape around the drill bit 1/4" - 1/2" up from the tip. This is to ensure that you don't drill into the other side of the rail. A drill press will make this job easier, but a hand drill will work fine. Clean up any burrs (be sure to check the inside as well), but don't worry about any potential sealing issues - the O-ring on the damper seals on the side of the counterbore, not the bottom, so you'd have to try pretty hard to mess up the seal on the side by drilling a hole in the bottom. Re-clean the inside of the rail if necessary. Be sure to lightly oil the O-ring on the damper before installation.
14. Install the 90° fittings into the NPT-threaded holes on each end of the fuel rail. Again, follow the NPT guidelines here.
15. Lightly oil the O-rings on the fuel injectors, as was done for the FPR / damper and install them into the new rail. Install the new fuel rail onto the engine. '94 - '97 engines will use the upper (farther away from the rail) holes, 99 - 05 engines will use the lower holes. Try to weave the fuel return line into an appropriate place between the runners of the intake manifold. Make it so that the fuel line ends up near the hard line(s) by the frame. Re-use the black plastic spacers at the bolts, again being sure to not lose them. Once everything is properly lined up, tighten down the bolts holding the fuel rail down. You should be able to turn the injectors, although there will be some resistance. If they spin freely or won't spin at all, something's wrong. Take the assembly apart and see what has happened. If one or more of the injectors won't spin, chances are one of the O-rings was unseated and is binding. Fix this (replace the O-rings if they're damaged) and reinstall everything.
16. Weave the fuel feed lines up to either end of the rail. Experiment with different routes to get the smoothest, cleanest routing. Be careful with what the SS lines rub against. While the lines typically won't wear, what they're rubbing against will. Protect or move things as needed. Once you're satisfied, smear some oil on the threads and taper of the male fittings and tighten the lines onto them. Be sure not to over-tighten the tapered fittings, as that's fairly common. They should technically be tightened to 29 ft-lbs, but hand-tight plus a quarter turn is a good approximation.
17. **If installing our big fuel kit or fuel completion kit:** use the male-male-male tee fitting to connect the two -6AN lines going to the fuel rail to the -6AN hose coming from the fuel pressure regulator.



18. **'90 - '97 cars with stock fuel line (including NB engines in NA chassis) only:** Slip one end of the rubber return line onto the FPR and route it cleanly to the forward stock metal line on the frame rail. Slide the hose down until it hits the stop - the second bump - on the hard line. Then tighten the hose clamps. You want to get this tight, but don't strip the hose clamp. Slip the 5/16" barb to male -6 adapter (black piece in first picture) into the remaining length of 5/16" rubber hose. Tighten a hose clamp onto it, then tighten it into the female leg of the tee. Run the hose (again, cleanly and smoothly, with attention paid to avoiding abrasion) to the rear metal line on the frame rail. Tighten the last hose clamp and your fuel has been plumbed. Also push the vacuum hose onto the FPR.
19. **'99 - '05 cars with stock fuel line only:** Put the blue adapter (separate blue piece in first picture) onto the stock metal fuel line, following the instructions that were included with it. Now tighten the feed line from the fuel rail, being sure to follow the directions laid out in step 15.
20. Take one final look at everything, making sure that everything has been installed correctly. Double check the tightness of all of the fittings.
21. **'99 - '05 cars only:** Reinstall the top half of the intake manifold.
22. Tighten down the gas cap, reconnect the relay, and turn the car on - but DO NOT start it. Jump - a paperclip works well - "GND" and "F/P" in the Diagnosis box in order to keep the fuel pump on. This ensures that the system is fully primed. If you don't have a metal terminal in the "GND" location, use a wire to jump "F/P" to a chassis ground (e.g., a random bolt with no wires going to it). Some of the later cars did away with the "GND" in the diagnosis box. Leave the jumper connected for at least 10 seconds, then remove it. Once the fuel system is primed, check all of your connections and be sure that there are absolutely no leaks. Check all of the junctions, including all of the fittings, where the new lines connect to the hard lines, and where the fuel injectors seat into the fuel rail.
23. **'90 - '97 Cars Only:** Once certain that there are no leaks, start the car. Pinch off the return line and make sure there are no fuel leaks. This increases the fuel pressure to the maximum, so you'll be able to check for leaks in the situation most likely to create leaks. '99 - '05 cars run at a constant fuel pressure.
24. Check again for leaks. For obvious reasons, it's imperative that there are no leaks.
25. It's also a good idea to check for vacuum leaks where the injector seats into the manifold/head. To do this, spray carb cleaner at the seat of the injector - while the car is idling - and listen very closely to the idle of the car. If it stumbles, even a little bit, it means that the engine has sucked in carb cleaner, which therefore means that there's a vacuum leak. Be sure that you can repeat this behavior before deciding that you have a vacuum leak. Chances are that the cause of this is that your injector seats are dried out and hard. You can get new ones from us (part number 04-46905) or Mazda.
26. Since the fuel rail is no longer a limitation on how much fuel your engine gets, you'll need to re-tune whatever engine management you have. As always, a wideband O2 sensor is the best way to do this. That's it, you're done! Enjoy your added fuel volume!

