



### Bleeding Air from Diesel Fuel Lines on Japanese Yanmar Tractors

If you have run your tractor out of fuel, or just changed your fuel filter, you'll need to "bleed" this air from the fuel system to allow your tractor to run. Diesel fuel injectors are spring loaded contraptions that "pop" open at a pressure of about 2000 psi. If there is air in your fuel lines, each cycle of the pump will merely compress this bubble of air, rather than pushing fuel through the injector. No matter what you do, your tractor will not run properly, if at all, with air in the fuel lines. Fortunately, bleeding the air is easy.

For this job you will need:

1. Phillips head screw driver, and/or a 10 mm wrench (preferably a socket)
2. A rag to clean up the diesel fuel that **IS** going to be spilled
3. Protective eye wear to keep diesel out of your eyes
4. In some cases, a helper to crank the tractor's engine while you bleed the lines, and a 13 mm wrench (preferably a socket)

Follow these steps to quickly and effectively bleed the air from your fuel system:

1. Fill the fuel tank with diesel fuel.
2. Make sure the petcock valve on the top of the fuel filter assembly (right side of the engine) is in the open (down) position.
3. With either a Phillips head screwdriver, or a 10mm wrench, open the two bolts (which are hollow and ported) on the top of the fuel bowl assembly near the petcock. Start with the bolt on the left, then move to the one on the right. Loosen them just enough to get fuel and air bubbles flowing out around the bolts...you don't need to take them all the way out. When you no longer see bubbles, and have a steady stream of fuel, close them back.
4. If you are bleeding the line because you just changed your fuel filter, then you should have all (or close enough) of the air out of the lines at this point and you can proceed to step 6.
5. If you ran your tractor until it ran out of fuel and shut down, then you'll need to follow the fuel line from the filter assembly downstream to the injector pump. You'll know it's the injector pump if it has the rubber fuel line from the filter going into it, and multiple metal fuel lines (one for each cylinder) coming out of it and running to the top of the motor. On the fuel pump you'll see a roughly sphere-shaped fitting with a ported bolt on it just like the two bolts on the filter assembly. Loosen this bolt in the same fashion, and let all the bubbles escape. Close it back after you get a constant stream of diesel only, no bubbles.
6. At this point you're ready to try starting your tractor. Follow the proper starting procedure for your model, and crank the engine with the THROTTLE WIDE OPEN so that you're moving as much fuel as possible through the system. Did you follow step 1 and fill the fuel tank? Good. There could still be a small amount of air in the lines that will cause your tractor to "miss" briefly, but can be purged by the pump. Let the tractor run for a moment until any sputtering or misfiring ceases and the tractor runs normally. If it runs normally, then you're finished.
7. If your tractor will not start, or it starts but runs unusually (sputtering, missing on a cylinder, pumping an unusual amount of smoke from the exhaust) then you need to take one more step. Air is still trapped in the metal injector lines between the pump and injectors. At this stage, you will need a 13mm socket wrench, protective eyewear, and a helper. While your helper sits on the tractor and cranks the engine at full throttle, loosen the 13mm bolt on top of one of the injectors. Once again you'll see a mix of fuel and air bubbles escaping with each cycle of the pump. Let the fuel and bubbles escape until **a**) you get no bubbles, at which time you should quickly retighten the bolt and have your helper stop cranking the engine; or **b**) until 10 seconds have elapsed. At 10 seconds, if you're still getting bubbles, quickly close the bolt and stop cranking the engine. You still have some air in the lines, but you need to stop and let the starter motor cool down, or you risk ruining it. After a few minutes, repeat the process until you see no more bubbles. In

some extreme cases you may need to bleed / rest / repeat several times to get all the air out of each line. You then need to repeat the process ON ALL INJECTORS. Some multi-cylinder engines will run (albeit not very well) when one of the cylinders is failing to fire due to air in the line to that cylinder, so if you have to go all the way to this point, be sure to bleed each injector line to make sure you get all the air out of each line. As soon as the air has been purged, the tractor will fire up and run strongly, at which point you should quickly retighten the final bolt, clean up the spilled diesel, and get back to work!

**Clean up note.** Diesel fuel tends to “yellow” the paint on your tractor if it’s not cleaned up thoroughly. Using a citrus-based degreaser (be sure to rinse it off afterward) or soapy water to clean up the spilled diesel will keep everything looking newer longer!

**Be kind to the environment!** Perform this process in an appropriate location... Don’t let spilled diesel run onto the ground and into our water ways where it will foul our drinking water and ruin the fishing! Dispose of all waste fuel, dirty rags, etc properly.