M14P CONNECTIONS

1. Oil Connections

There are two connections for oil. They are the oil inlet to the oil pump (Figure 1) and the oil scavenge pump outlet. They should be at least – 10 size hose. In non-aerobatic use, the inlet comes from the oil screen assembly which is gravity fed from the oil tank. In Aerobatic situations, the oil comes from the flop tube in the oil tank.

Figure 1. Oil Inlet (Oil Pump Inlet Fitting P/N 526200-60W)

You will note that in this Yak-52 installation there is also an inlet for fuel from the oil dilution system. This is not recommended for most installations. It was used to add gasoline to the oil system before shutting down on really cold nights. We prefer you use a pre heater.

The second connection is from the oil scavenge pump (Figure 2). It is sometimes referred to as the oil return line. As this is a dry sump engine, there is a second larger capacity pump that takes the oil from the main case and sends it back to the oil tank. This line usually goes through the oil filter if you install one and then through the oil cooler to the oil tank. Be careful to keep the resistance of the lines, filters, and oil cooler low. Use large diameter lines –10 or –12 sizes. If the scavenge pump has too much resistance, it cannot keep up with removing the oil from the case and this results in oil blowing out the vent system or the interstitial mushroom vent cap for the supercharger seal (we had this happen once).

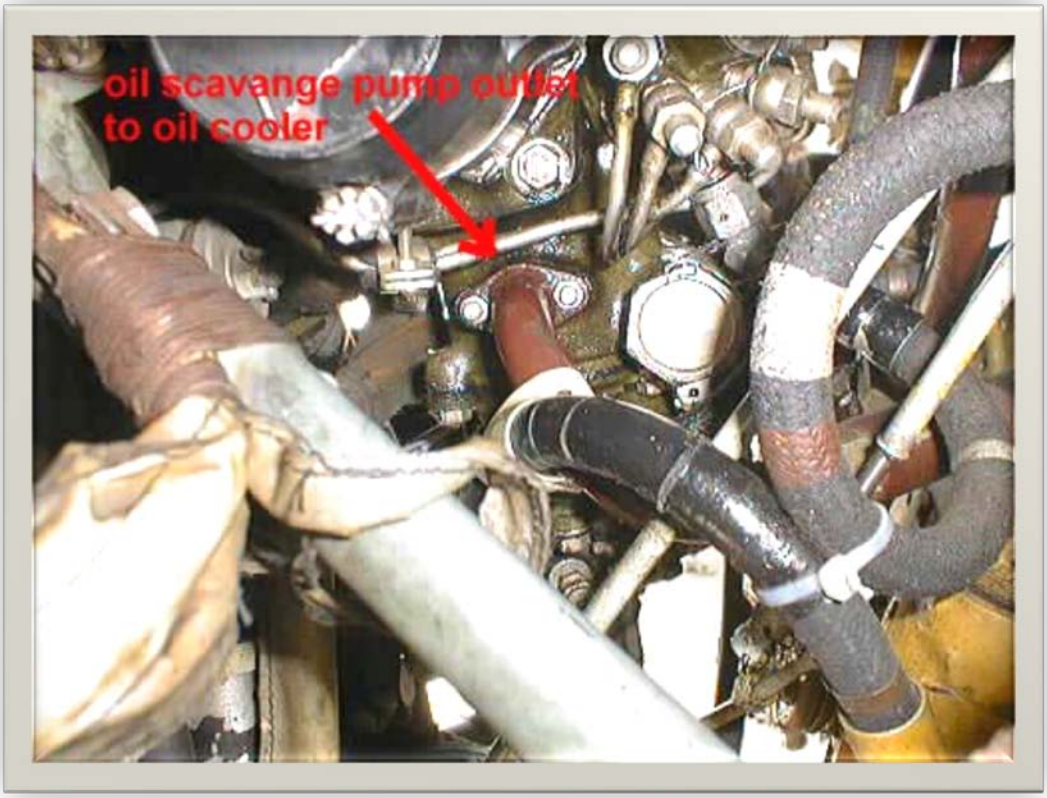


Figure 2. Oil Scavenge Pump Outlet (Oil Scavenge Pump P/N 526200-10W)

2. The Case Vents

There are two vents in the engine case, one in the nose case (Figure 3) and one in the main case. They are usually connected together and routed either overboard or through an air oil separator then overboard. (NOTE: the actual part has a hose fitting like the main case fitting not the threaded fitting as shown.)

Figure 3. Nose Case Vent (Oil Breather/Vent Nose Case P/N 526200-120W)

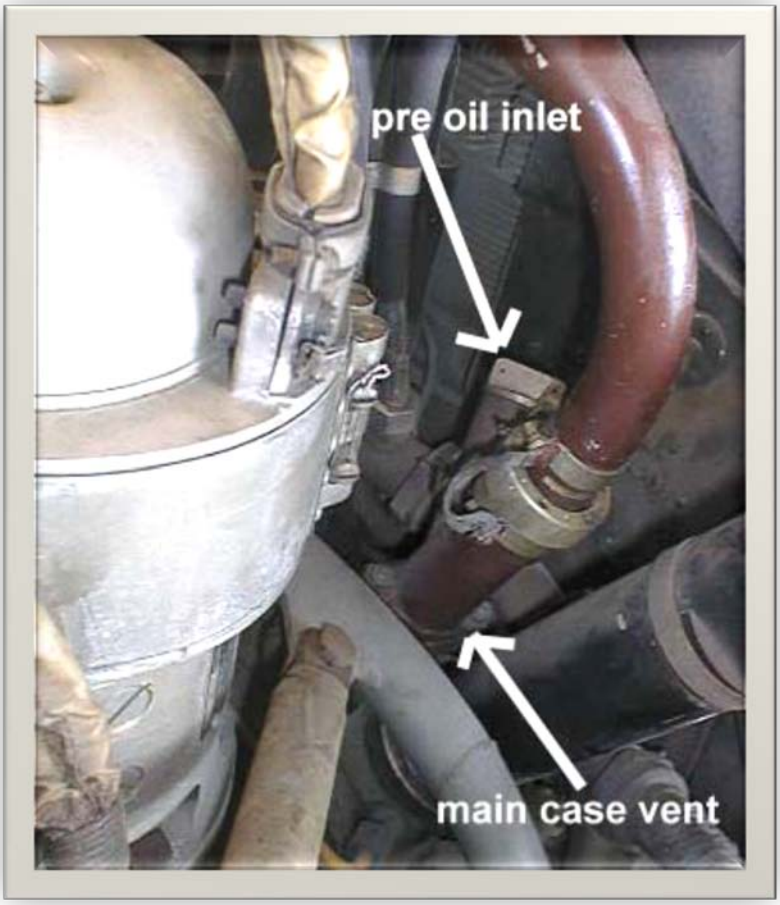


Figure 4. Main Case Vent (Oil Breather/Vent Main Case P/N 526200-100W)

You will note that there is a separate opening at the main case vent (Figure 4). It has a small cap on it. It was used in the olden days to pour hot oil into the case to preheat and pre oil the main case. You have probably read stories of heating the oil over a fire and then pouring it in the engine in those arctic conditions. Well if you must you can do it here. We find it better to use a standard pre heat system. If you decide to use an air oil separator (necessary in aerobatic installations) then you can route the return oil to the nose case (Figure 5). If you do not use this then just cap it off.

Figure 5. Separator Return Line (Oil Return Nose Case Fitting P/N 526200-50W)

3. Fuel Connections

There are four and sometimes five connections dealing with the fuel. The first is the fuel pump inlet (Figure 6). You need to use at least –6 hose here. This is fuel coming from your strainer or water separator.

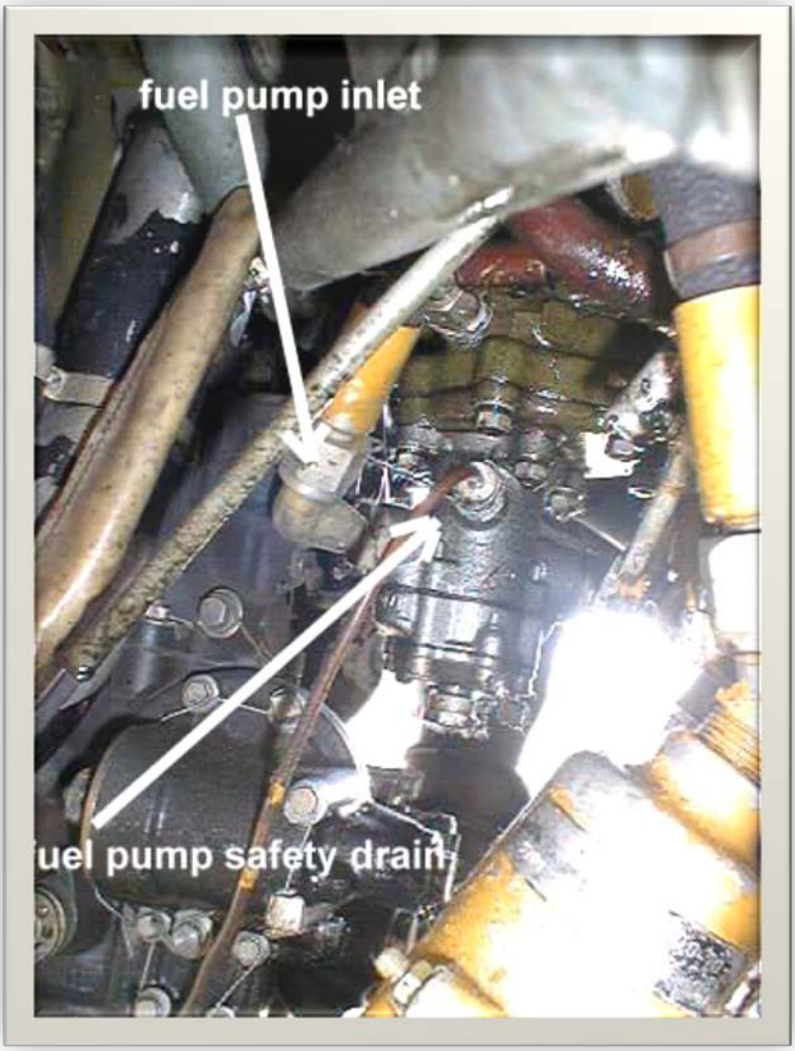


Figure 6. Fuel Pump Inlet (Fuel Pump Inlet Fitting P/N 526200-2W)

You will also see in this picture a drain line from the pump. This is the safety drain in the event the fuel pump seals fail. It should be routed overboard. NOTE if you use an electric boost pump it should be routed in parallel with the main mechanical pump. It then can be used to pressurize the system to aid in starting and in emergency if the main pump fails or is blocked.

The next connection is the fuel pump outlet (Figure 7). It is a banjo type fitting with a second small fitting for connection to your fuel pressure gage. The fuel pump outlet is routed to a fine filter in the Russian aircraft. Most of

the U.S. installations take it directly to the carburetor inlet. In the Russian aerobatic systems it also goes through a small ball with a built in flop tube. This allows the fuel and any air that enters the system to be separated. Remember a pressure carburetor is like a fuel injection system. Any tiny amount of air going into the carburetor and the engine stops cold until the air pocket is passed through. This can result in heart failure in some pilots. The Russian system has a small bleed line from this fuel ball back to the header tank. This also serves to eliminate any vapor locking in the system. Most U.S. installations do not do this, though some do have a small bleed line back to the fuel tank from the fuel pump outlet to eliminate any possibility of vapor lock.

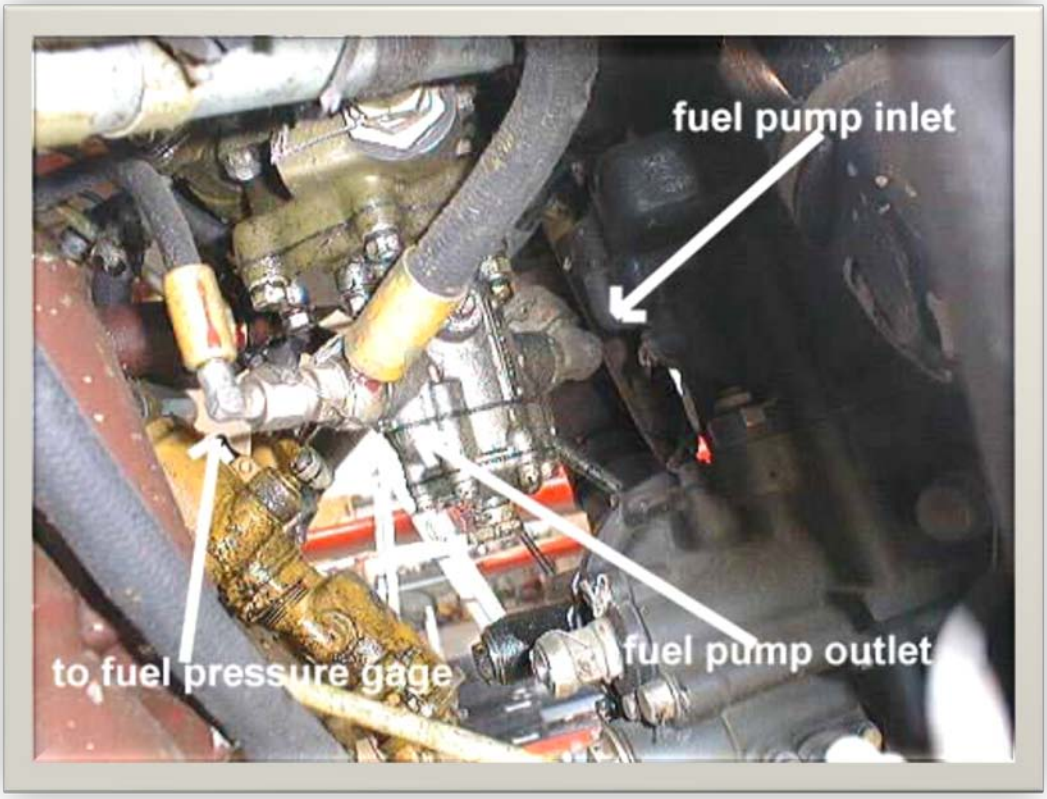


Figure 7. Fuel Pump Outlet Connections (Carburetor Fuel Inlet P/N AK14-01W)

The last connections are for the primer line. In the Russian systems, the flexible hose line goes to a fitting that is clamped to the number 2 inlet pipe.

It is then routed through a solid line to the inlet port in the supercharger case (Figure 8). This should be hooked to either the mechanical primer or an electric pump for priming. These engines take a lot of priming. The air start engines are very difficult to flood. Remember you are inserting compressed air at high pressure into the cylinder just past top dead center during starting. This has the effect of diluting the fuel air charge. The spark plugs in the top cylinders almost never get wet enough to not fire. The bottom plugs are probably oil soaked anyway. They will burn clean after you start. This is normal.

Figure 8. Primer Inlet To Supercharger Case (Primer Line Inlet Fitting P/N 14-717-107-01W)

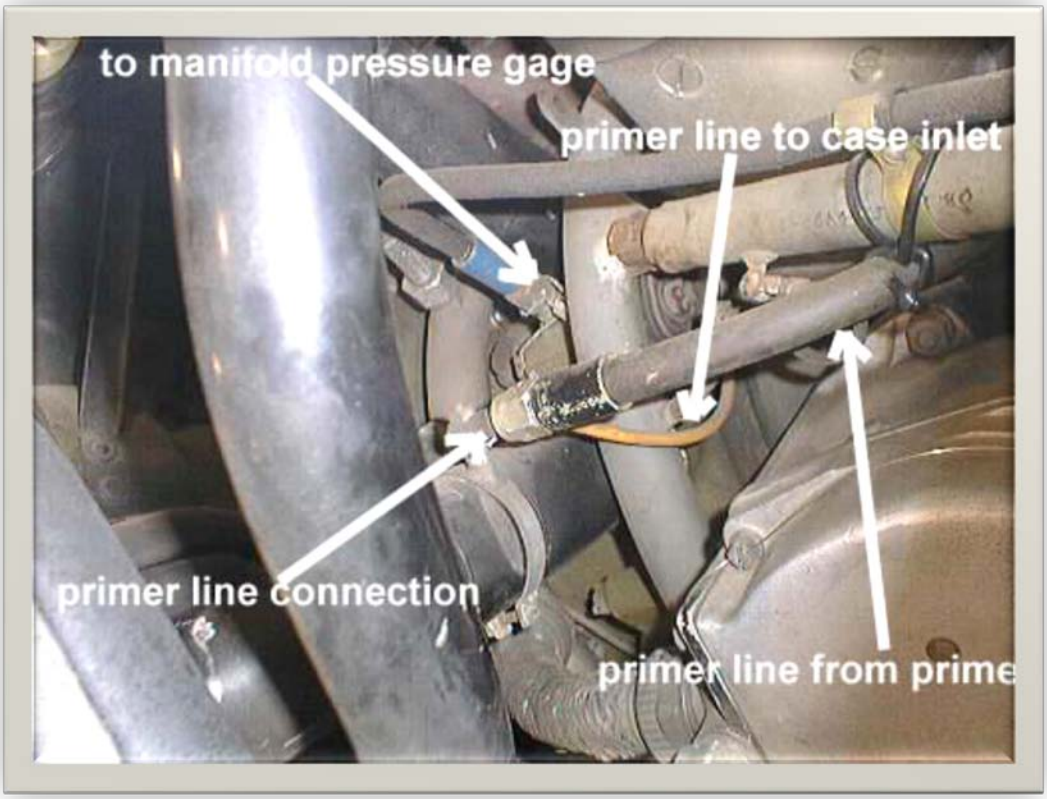


Figure 9. Primer Line Connection (Oil and Manifold Pressure Fittings P/N 14-17-611W)

You will also see in Figure 9 the place to connect your manifold pressure gage. Remember that this is a supercharged engine and your gage must be able to show positive pressures. A gage that shows up to 40 inches of pressure will do. The 400 HP engine at sea level will develop about 40 inches, the 360 HP engine about 34 inches of pressure. While we are here, remember that this is a geared supercharger. The amount of boost is proportional to the engine RPM. So if you need more pressure and the throttle is wide open, bump up the rpm and the pressure will increase. It is not dangerous to “over boost” these engines. The Russians in aerobatic flight regularly fly them with the throttle wide open and the RPM at 80%.

4. Air Connections

Figure 10. Air Compressor Outlet (Air Compressor Outlet P/N 14-950-164W)

The air compressor outlet (Figure 10) has a Banjo style fitting. This normally has a solid steel or aluminum line that then goes through a couple of large turns to cool and provide strain relief. (Note the two turns in the tubing on this Yak-52 just below the air compressor). The line then goes to an air/water separator (sometimes called the snot valve referring to what the stuff looks like that is drained from the separator). The air/water separator functions just like the ones used on air compressors. It has a drain that allows the pilot to drain the accumulated water/oil mix that is trapped and

thus kept out of the air system. The Air/water drain then usually goes through a check valve to the air system.

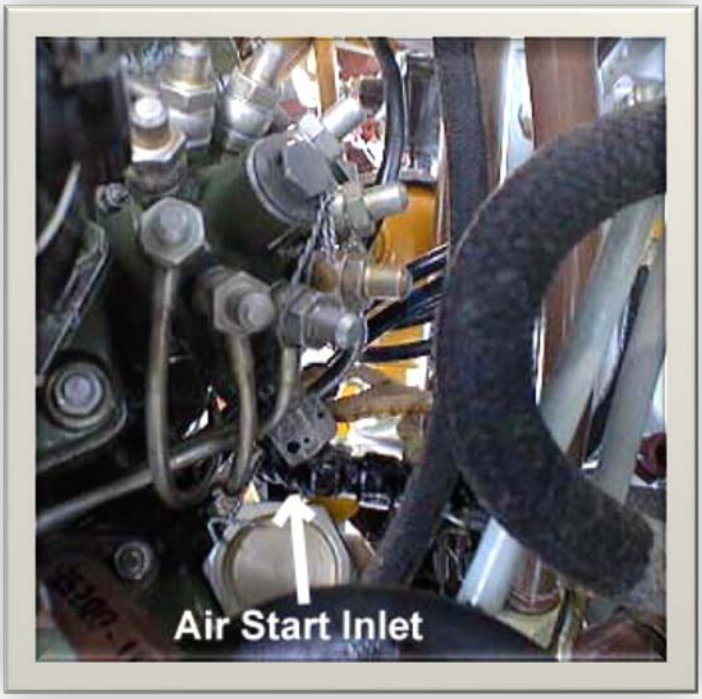
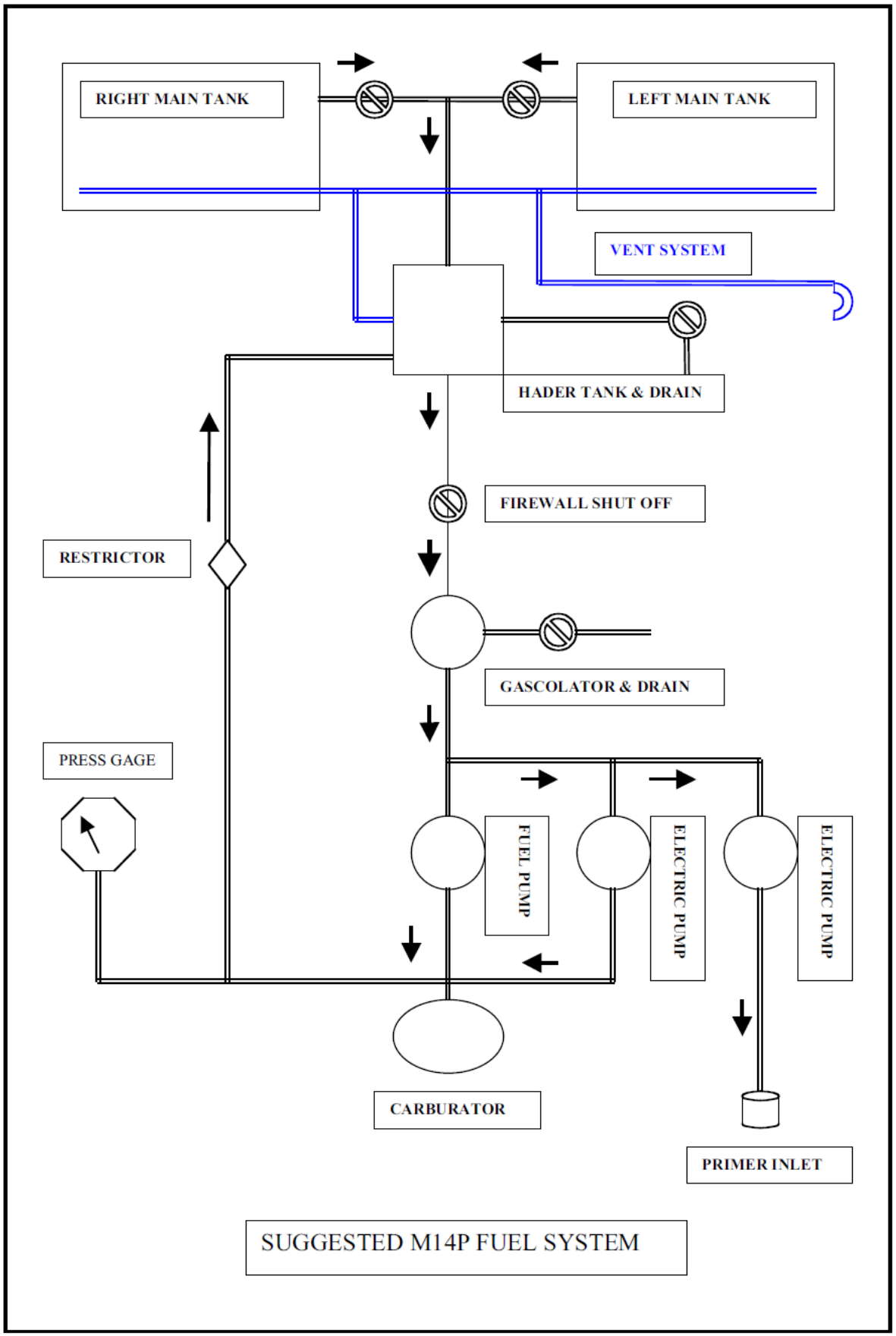
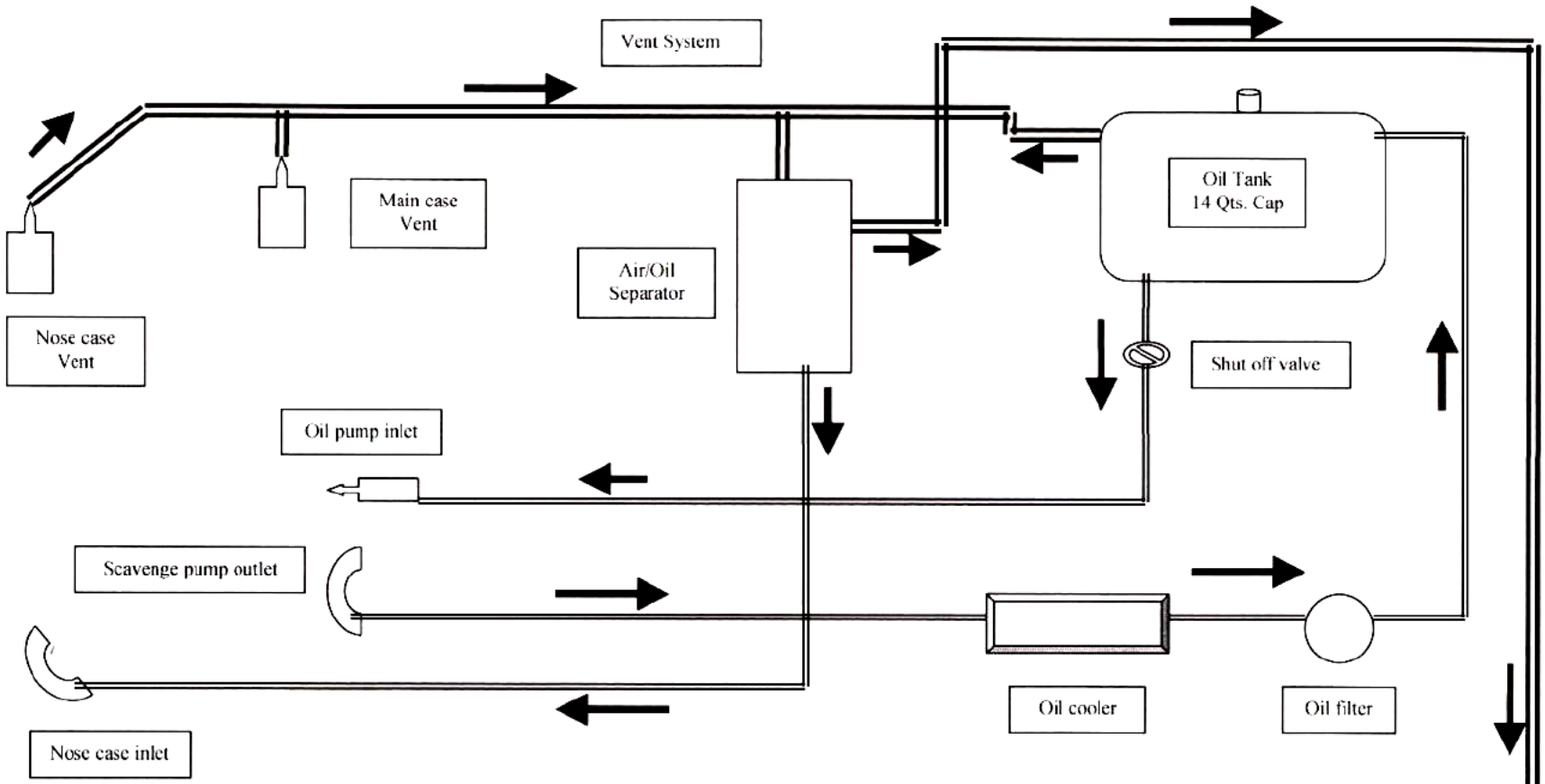


Figure 11. Air Start Inlet Connection (Airstart Fitting P/N 14-627-100W)

This is where you need to put compressed air to start the engine (Figure 11). You should have about 750 P.S.I. maximum. If the pressure is below 300 P.I. it will be difficult to start (particularly when cold). The air comes from the air bottle through your electric air start solenoid.



SUGGESTED M14P FUEL SYSTEM



OIL AND VENT SYSTEM M14P