Ford V-8 Fuel Pumps

First a little history: Ford first used the mechanical fuel pump on the 1932 Ford cars. It had been in use for approximately 4 years by other manufacturers. The mechanical pump was a great help to making the automobile more user friendly. Before the fuel pump was used, gas was delivered to the carburetor via gravity or pressure from a hand pump.

Gravity systems used either tank placement or a vacuum tank to feed the carburetor. The vacuum tank would get its vacuum from the engine and then suck the fuel from the tank into a chamber were the fuel could run down to the carburetor. The other option for gravity system was to place the tank higher than the carburetor as in the Model A.

When Ford designed the V-8 engine, he placed the fuel pump on the top of the engine, while other V-8 engines used a long arm to reach past the cylinders to the camshaft allowing a lower placement of the pump. The lower placement had a couple of advantages that the Ford placement did not. The most important advantage was that the tank outlet and the fuel pump were on the same plane allowing easier priming of the pump, the other advantage was that it was in a place that was easier to keep cool. These engines also had their exhaust manifolds located at the top of the engine. They were also much more expensive to build than the Ford design.

The 1932 V-8 fuel pump was used only in 1932. I don't have any other information about this pump, other than its mounting was unique to the 1932 V-8.

In 1933 the fuel pump stand and oil filler stand were combined and the 40-9350 pump was used in production. This is shown in Fig.1. This pump was used from 1933-1936. It looks similar the fuel pumps used up to 1946. It does not have a glass sediment bowl, the body diameter is approximately 1 15/16" and the outlet port to the carburetor is about 1/4' lower than the input port. It has a hex head screw for the sediment bowl drain. The valves in these pumps are made up with 2 hex shaped phenolic valves, 2 springs, a spring retainer, a valve retainer plate and a gasket.

The 68-9350 (fig 2.) was introduced in 1936. This pump was used from1936 though 1940. It has a larger 2 1/4" body diameter, the top is more rounded. The outlet port is still 1/4" lower than the input port. The parts catalogs up to 1940 show this pump with the hex head sediment bowl drain. The 1940 catalogs show this pump with a petcock type wing nut drain. I am not sure when this type of drain was introduced.

1937 brought us the 60 HP engine and another fuel pump, P/N 52-9350 (no photo). It is similar in size and appearance to the 40-9350, but the alignment to the fuel pump stand is different.

The 11A-6350 (fig.3) replaced the 68-9350 in 1941 and was used until 1946. It differs from the earlier pumps by having the outlet port at almost the same height as the inlet port and the cover was changed to have projections to help guide the cover onto the body. The valves were changed on this pump to pieces assembled in a brass holder. This type of valve is still in use in mechanical pumps. The sediment drain is shown as the petcock type wing nut.

In 1947 the 59A-9350 pump (fig.4) was released. It incorporated a glass sediment bowl. It uses the same valves and diaphragm as the 11A-9350. The glass sediment bowl increased reliability by collecting most of the debris before it got to the valves in the pump. These pumps do not have a separate sediment drain.

The 1949-53 (fig5) cars used a pump that is similar in appearance to the 59A-9350. The sediment bowl is smaller, the inlet thread size is smaller and they have different mounting angles. A dual action pump was also available during these years. I do not have sufficient data to further identify these pumps.

The application data in this article is general in nature, as the information came from Ford Chassis Parts catalogs from Nov 1935, January 1939, May 1940, October 1941, March 1948 and November 1950.

General Maintenance: When installing the pump, pack grease around the operating arm. This will help lubricate the pivot. Make sure that the cup on the operating arm is on the pushrod. Use a line wrench to tighten the fittings to prevent rounding the soft brass fittings.

After installing the pump, the maintenance should consist of draining and cleaning the sediment bowl on a regular basis. On the 33-46 fuel pumps, drain the fuel and remove the top cover. Pay particular attention to the relationship of the gasket to the screen. Some gaskets are replaced above the screen while other pumps require the gasket to be below the screen. Remove the screen and clean it, then vacuum out the sediment bowl. Replace the screen and the top using a new gasket. The rubberized cork gaskets give a better seal than the just plain cork gaskets.

The glass bowl fuel pumps should be cleaned in a similar manner. Use a rubber gasket with the glass bowl, they seal better. Finger tight will seal the glass bowl against the rubber gasket. Be careful to not over tighten the bail. This will warp the fuel pump top and cause a vacuum leak.

If there is a large amount of debris in the sediment bowl, you may be having problems with rust in your tank, deterioration of the flex line or rust on the inside of the fuel line from the tank. You should find the source and repair it because debris can cause the input valves of the pump to fail, and the pump will not be able to prime itself. The debris can also clog passages in the carburetor.

Some trouble shooting tips: Common fuel pump problems are failure to prime and insufficient fuel delivery. Vapor lock is considered insufficient fuel delivery.

Failure to prime: There have been many complaints about gas evaporating from the carburetor when the vehicle sits for more than a week. This means that the fuel pump must prime itself and pump some gas into the carburetor before the engine will start. The Ford V-8 fuel pump must be able to generate and hold vacuum in order to draw the gas from the tank and lift it as much as 18 inches to the sediment bowl. Once the pump is primed, the pump must deliver gas to the carburetor. The source of the vacuum is the diaphragm and the input valve acts to hold the vacuum. A good pump will prime itself in about 30 seconds and start the car in about 60 seconds. Add about 30 seconds of time to fill the glass sediment bowl. Do not crank your car continuously for this length of time or you will burn out the starter.

If you are having a problem with priming the fuel pump, hook a vacuum gauge to the input of the fuel

pump and crank the engine. The vacuum gauge reading should rise to 10 inches in 18 seconds. Stop cranking the engine and watch the needle on the gauge. It should take one minute to reach 0. In order of probability causes of failure in this area are top cover or sediment bowl gasket leaks, input valve not working or defective diaphragm. The valves in the new after market pumps made by Air-Tek will not hold vacuum above 5 inches. This may lead to priming failures.

If the above test showed that the fuel pump was OK, move the gauge to the next connection in the input side of the fuel pump and retest. This will check out the flex line and the connections to the tank. If these tests results show good connections, the problem could be plugged lines or tank pickup. A bad connection may not leak fuel, but it will leak vacuum. The flex lines can leak at the crimp for the connection or from pinholes caused by not being alcohol resistant. Another cause of failure to prime is rust clogging the line or the pickup in the tank. To check the line, disconnect it at both ends and blow through it from the fuel pump end with compressed air. The tank end should be directed into a container to catch whatever comes out of the line.

I do not recommend pouring gas down the carburetor to start the engine. It leads to too much gas entering the cylinders and washing all of the oil film from the cylinder walls. Use a starting fluid to start the engine. Electric pumps will prime the carburetor for starting the car, but they can lead to other problems, such as vacuum leaks in the fuel line.

Insufficient fuel delivery: This condition shows up when driving at highway speeds as a miss or the engine dies. Vapor lock occurs when the fuel pump output pressure is very low and the engine is hot. It is much rarer than commonly thought. Most cases of suspected vapor lock can be attributed to another problem such as a weak coil or condenser, but can be caused by a weak fuel pump. To determine if you really have vapor lock, remove the air cleaner and look in the bowl of the carburetor, while operating the accelerator linkage. You should see two streams of gas in the carburetor if you don't, you have a fuel pump problem.

Fuel pump pressure is controlled by the return spring under the diaphragm, too little pressure means the spring is weak, too much pressure means the wrong spring was used. Pressure should be between 1.5 - 3.0 lbs at all engine RPMs. Too much pressure will not allow the float to control the amount of fuel in the carburetor bowl, low pressure will affect fuel delivery.

To check fuel delivery, you need a graduated 16 ounce or larger container to determine the amount of fuel delivered in a measured time. Disconnect the fuel pump line from the carburetor and direct it into a graduated container. Crank the engine long enough to get 2 ounces of gas in the container and then continue cranking for 15 more strokes of the pump. The pump should have delivered 6 more ounces of gas.

Insufficient fuel delivery can be caused by a vacuum leak, plugged flex line, worn pivot in the pump arm, stretched diaphragm, plugged fuel line or tank pickup, plugged tank vent or wrong gas cap or a worn push rod.

Leaks: If you are leaking fuel around the fuel pump diaphragm, the diaphragm must be replaced. Leaks around the fittings can be caused by ferrule not crimped tight enough, fitting not tight enough, wrong

type of fitting used or the ferrule crimped in the wrong place, keeping the fitting from seating. Most of the auto supply and hardware stores do not carry the correct fitting any more, you have to order them from one of the vendors that support the hobby. Do not use Teflon tape on these fittings. It tends to shred when the fitting is tightened and the small particles will plug the carburetor orifices. I use a light grease to lubricate the fittings.

Rebuilding the pump: Your pump will require rebuilding if the arm pivot is worn, if it doesn't hold vacuum or pressure or if the diaphragm is leaking.

I do not recommend that you rebuild a fuel pump because complete rebuilding kits are hard to come by and the older kits sold at swap meets may have a diaphragm that is not compatible with the modern fuel and gaskets that have dried out. If you have a 1940 or older car, and you want to have your car point judged, I suggest that you have the pump rebuilt. There are rebuilding services that claim to have parts that work with the modern fuels. If you want to rebuild the pump yourself, the diaphragm can be ordered from most of the parts vendors. Order from one that you can trust and get their assurance that it is compatible with modern fuels and look for a kit at a swap meet. A complete kit (fig. 6) will contain new valves, diaphragm, return spring, operating arm parts and gaskets for your model of pump. You can use the gaskets in the kit as patterns for cutting new gaskets from fresh gasket material.

These are the steps needed to rebuild a single action fuel pump:

1) Take a file and make a mark across the diaphragm flanges. This mark will be used as a guide when reassembling the fuel pump to ensure that the inlet and out let ports are in correct alignment with the mounting flange.
2) Remove the rocker arm pivot pin by supporting the casting and driving the pin out. The rocker arm spring and the rocker arm can now be removed.
3) Remove the screws holding the top and bottom of the pump together and unhook the link from the diaphragm. The diaphragm and return spring can now be removed.
4) Remove the top cover , taking care to notice the relationship of the screen to the gasket, valves, taking care to notice their orientation and the type of valve (one piece or 6 piece).
5). Clean the castings in a good carburetor cleaner.
6) Examine the castings for corrosion or pitting in the valve area. If there is corrosion, you will have to machine the surface or discard the parts and look for another pump. Examine the mounting of the glass sediment bowl. If the bail has been over tightened, the bowl will not seat on its gasket properly. The bowl should fit up in the recess without rocking.
7) Assemble the new valves in the upper pump body. Be sure to use the new gaskets that came with the kit and that the valves are correctly oriented so they will maintain vacuum on the inlet side and pressure on the outlet side. (See fig.7)
8) Place the diaphragm return spring in position, then place the diaphragm in position and hook it onto the pump operating arm.
9) Insert the new pivot pin through the pump body and arm, then stake it to prevent it from working out of position. Replace the operating arm spring.
10) Place the top half of the pump in position and start all of the diaphragm screws. Tighten the screws until they contact the lock washers.
11) Operate the pump several times to seat the diaphragm and then tighten the screws using an

alternating pattern.
12) Replace the screen and top cover gaskets. Replace the top cover and check the pump operation for good vacuum and pressure.