The Ford Model A Water Pump

George Washington Chapter, Inc.

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This instructional is brought to you by the George Washington Chapter of MAFCA. The purpose is to provide information for the inspection, rebuilding, and installation of the Model water pump.

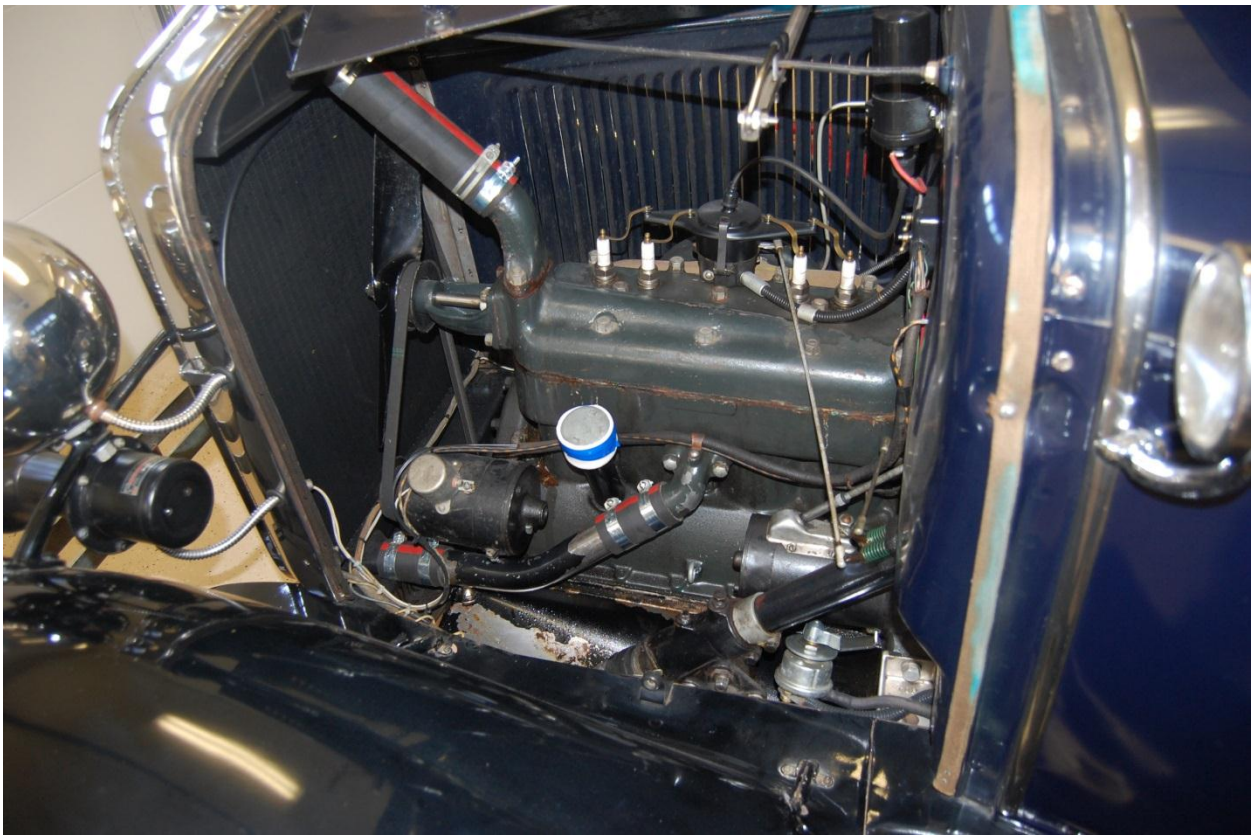
Water Pump Specifications

Water Pump Shaft 5/8" diameter

Water Pump Shaft End Play .006" to .010"

Radiator Hose Dimensions:

a. Upper: 2" diameter, 6-1/4" long (28-29) 8" long (30-31).
b. Lower: (2 pieces) 1-3/4" diameter, 2-3/4" long.

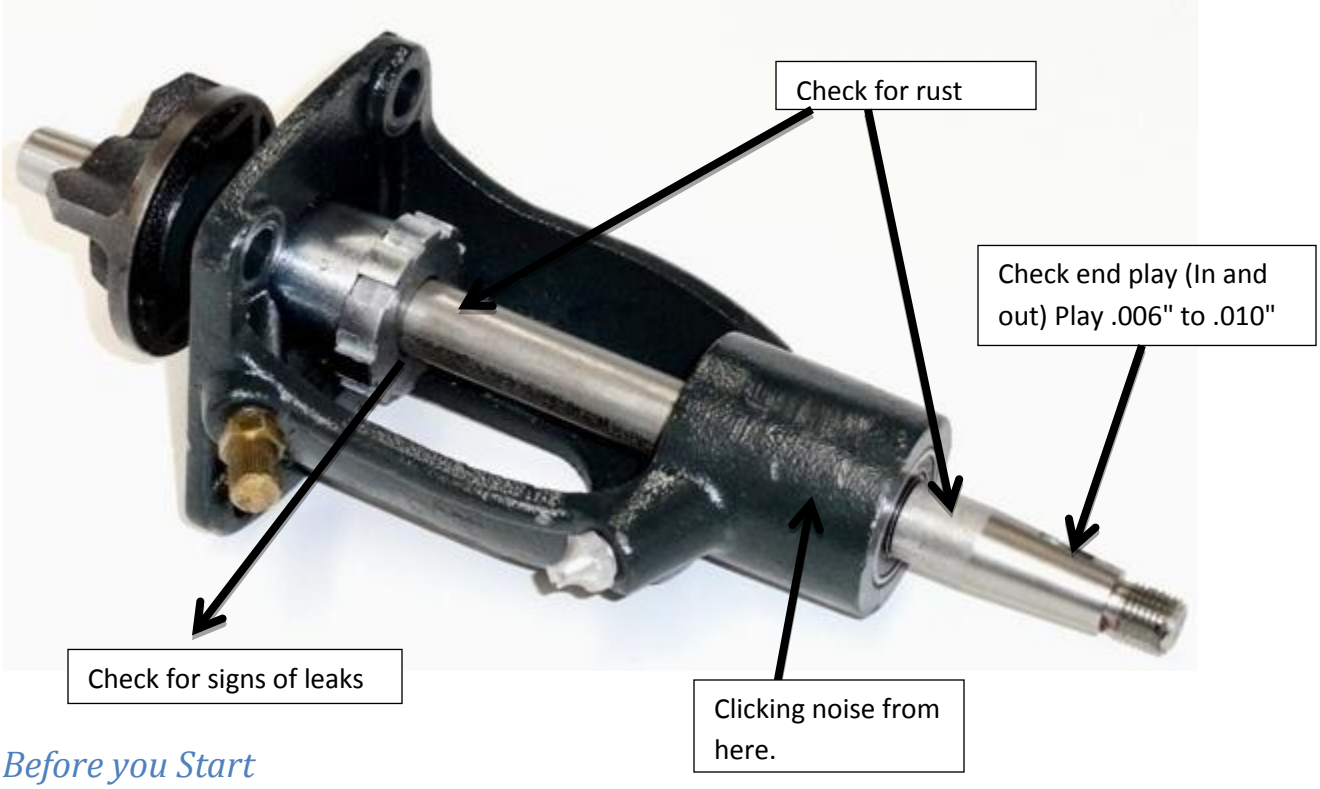


Our Patient is a 1930 Coupe owned by Jay Milton.

Inspection and Removal

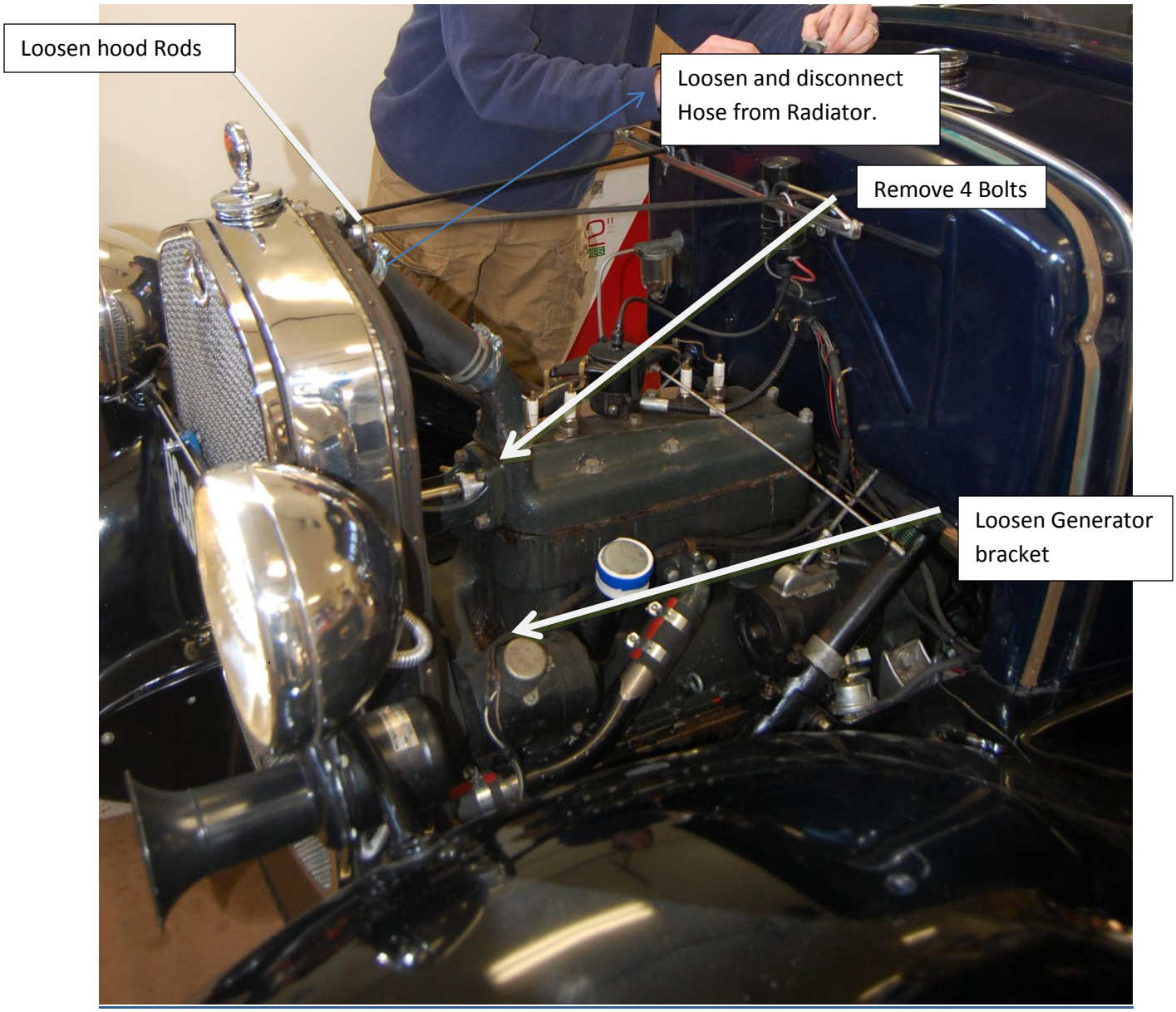
Inspection

Your water pump should be clean, rust free, without excessive end play or clicking noise. Therefor if you have rust, signs of leakage, too much endplay or noise you may need to rebuild the water pump.



Before you Start

Take a picture now, before you start, take different angles and take notes, know what you are getting ready to do. Read everything before doing anything.

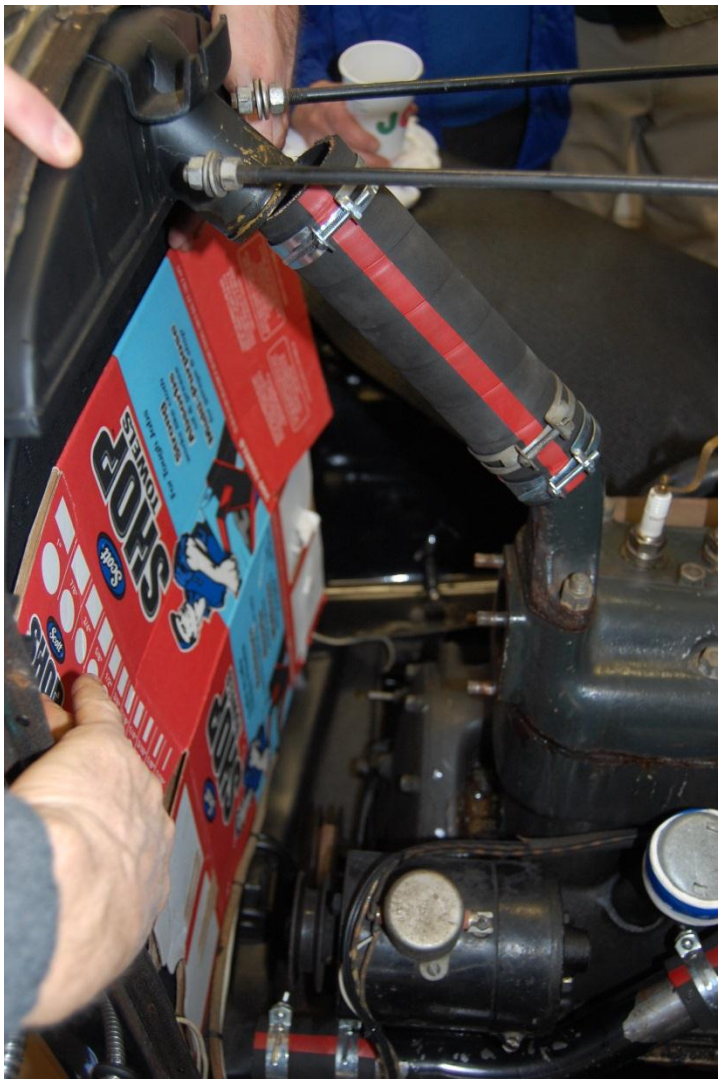


Removal

1. Drain radiator: turn the pet cock valve on the water outlet pipe to the open position (on the driver side of engine.)
2. Remove the hood and lay it aside. Next loosen the hood rods. (loosen only those bolts closest to the radiator, otherwise you risk messing up your hood alignment.) Disconnect the upper part of the radiator hose from the radiator. Now the radiator can be tilted away from the engine. This will allow for the room necessary to remove the Water pump. It is also

advisable to cover the radiator with some cardboard or other shield so that it is not damaged as you take out the water pump out.

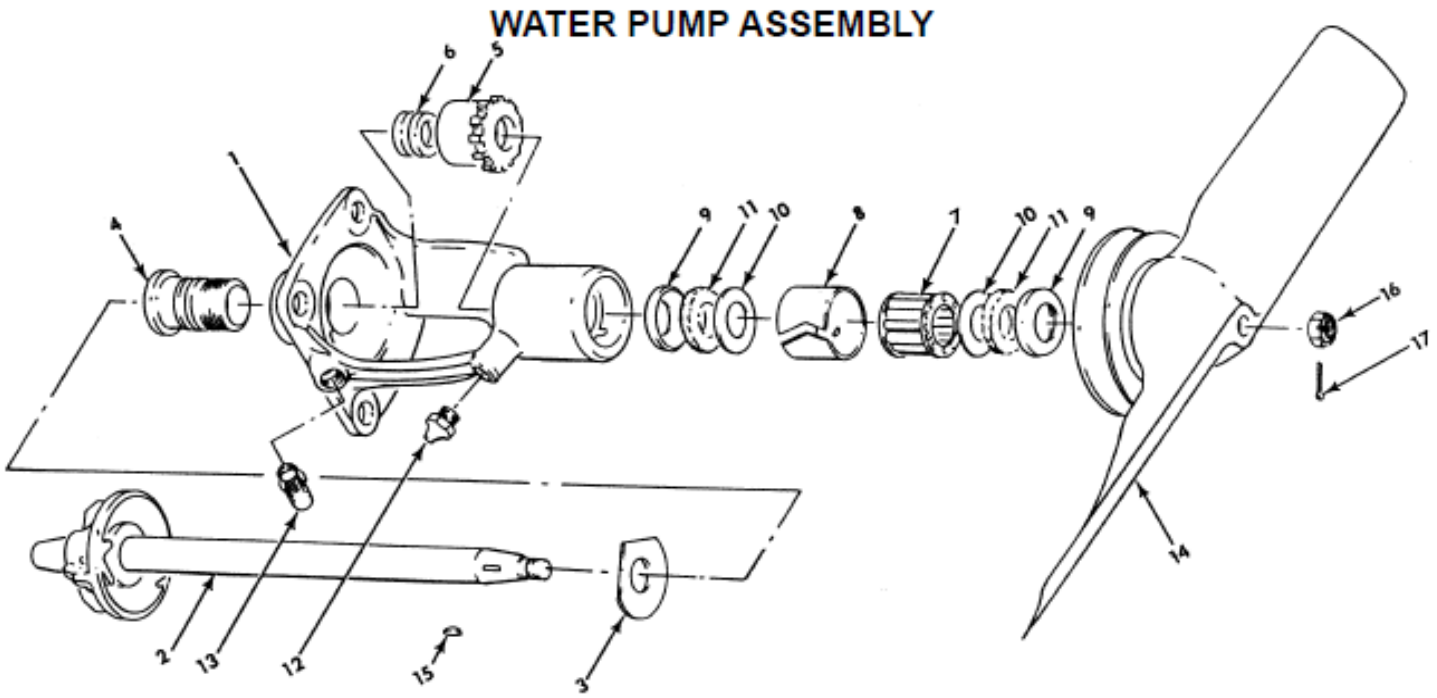
3. Loosen the generator bolt to allow slack in the fan belt. Remove the fan belt and lay it aside.
4. Loosen and disconnect Top radiator Hose from radiator.
5. Remove the four bolts holding the water pump to the head.
6. If the water pump is stuck or will not budge, give it a tap with a rubber mallet or block of wood to loosen it. Give it a wiggle and pull it forward. Take care as you remove the pump not to damage the radiator fins, this is why the cardboard or other protectant is important.



Once the water pump is removed examine the studs to see if they need to be replaced; they should not be loose, excessively rusted, and their threads should be in good working order. It is also an option now to replace your studs with bolts so you can do future work without having to disconnect the radiator and hood rods. It gives you the space needed to remove the pump without tilting the radiator forward. When installing the special stud with the nuts machined on them, add anti- seize compound such as Permatex #133k to the threads.

Remember to keep track of all the parts you have removed loosened or disconnected. Remember to take pictures as you go.

Rebuilding



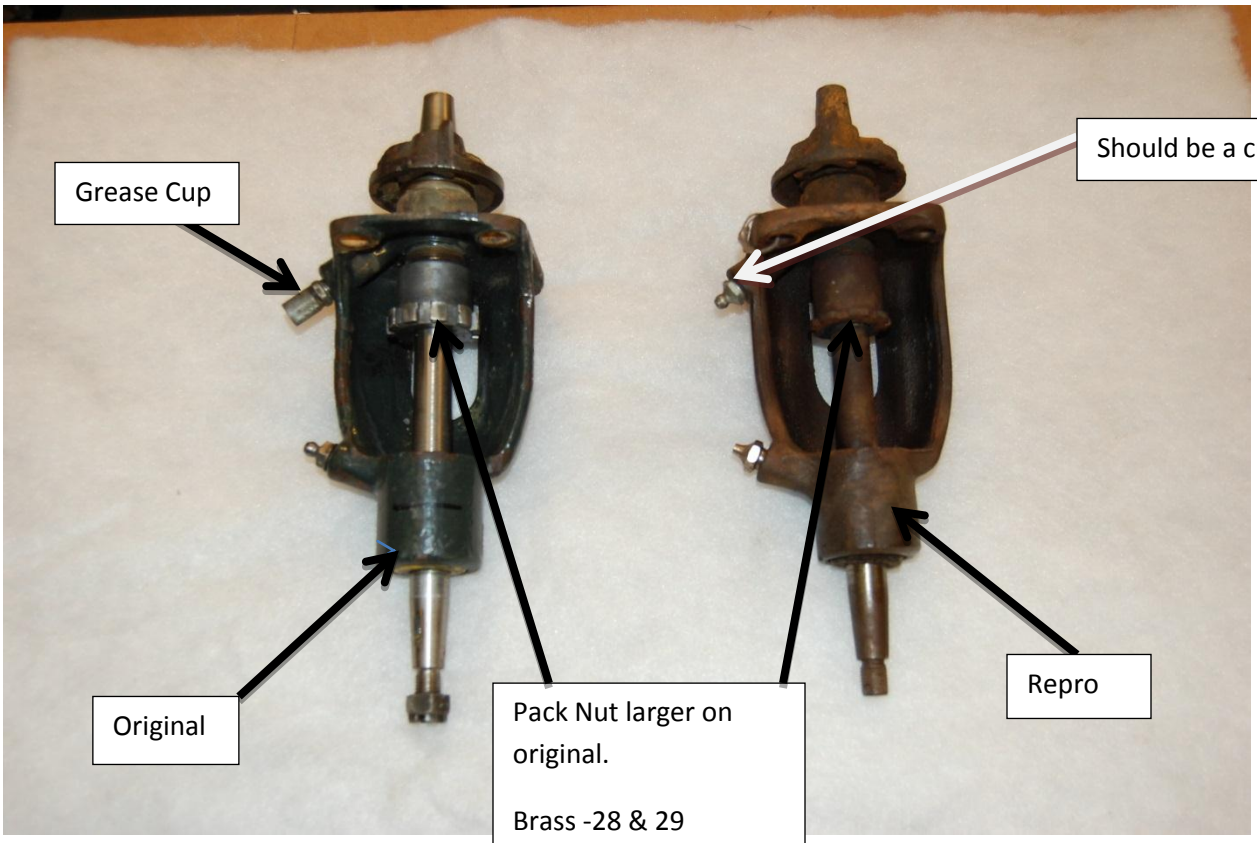
Index #	Part #	Description	No. Req.	Index #	Part #	Description	No. Req.
1	A-8501-PB	Pump Housing Only	1	6	A-8524-T	Teflon Packing	1
2	A-8510	Steel Shaft	1	7	A-8530	Roller Bearing	1
2	A-8510-SS	Stainless Shaft	1	8	A-8535	Roller Bearing Sleeve	1
3	A-8513-A	Steel Thrust Washer .	1	9	A-8540-A	Bearing Cup Washer	2
3	A-8513-SS	Stainless Thrust Washer	1	10	A-8554	Flat Bearing Washer	2
4	A-8520	Rear Bushing Assembly	1	11	A-8542	Bearing Felt	2
4	A-8520-B	Rear Bushing Assembly (Brass)	1	12	A-353027	Grease Fitting	1
5	A-8523	Brass Pack Nut (28-29)	1	13	A-8501-FIT	Grease Fitting	1
5	A-8523-Z	Zinc Pack Nut (30-31)	1	14	A-8600-A	Fan	1
6	A-8524	Rope Style Packing	1	15.16,17	A-8510-MS	Fan Mounting Set	1

The above exploded view is a useful tool when rebuilding a water pump. If you purchased a rebuild kit it should have come with this or a similar picture. We will include a few different pictures to aid you in rebuilding or replacing your water pump.

Modern and Original Pump Differences

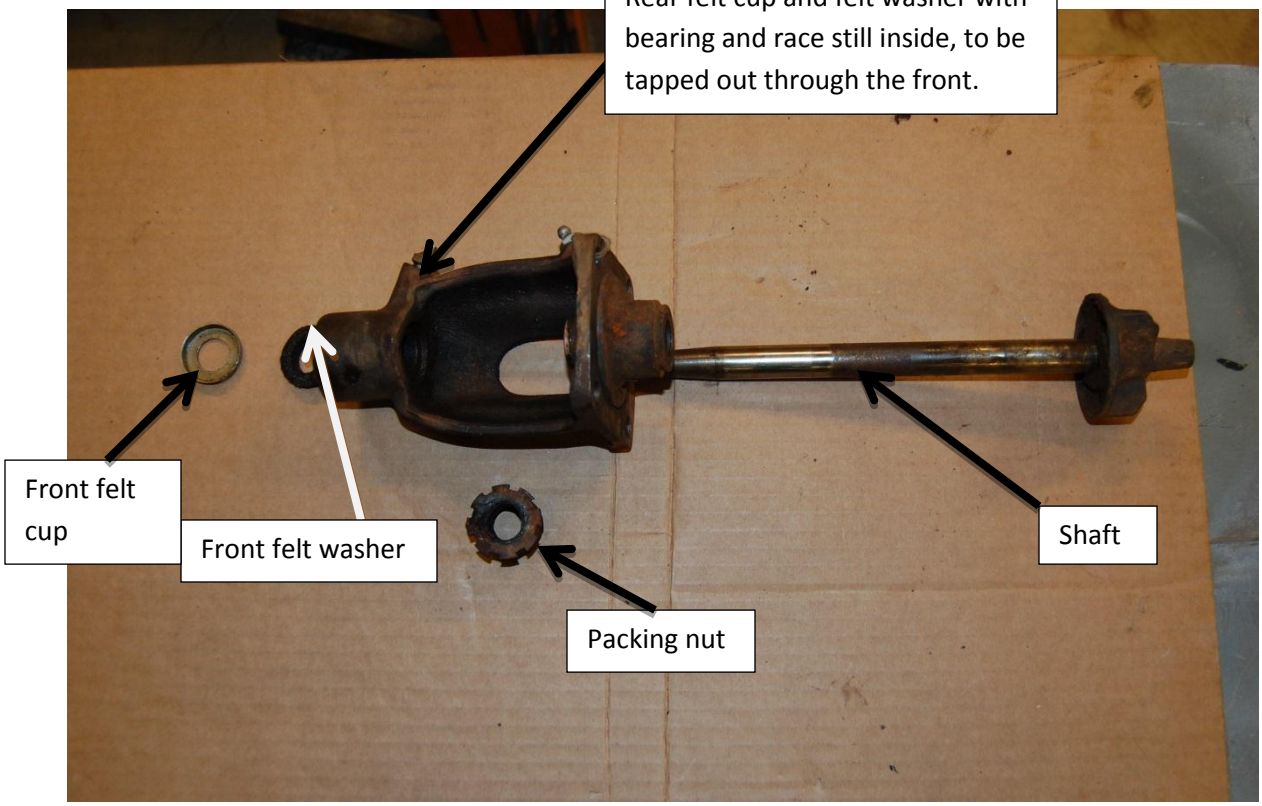
Original Pumps: On the original pumps there are grease fittings on the front and rear. The rear fitting is filled by unscrewing the cup and adding only water pump grease enough to fill the cup. Then replace the cup on the fitting and screw it in till it is tight, this pushes grease in lubricating the rear bearing. Do not over tighten as it will push grease past the bearing and into the radiator. This cap is tightened overtime to keep the bearing lubricated, approx. every 500 miles or as needed per inspection. The water pump grease cup should be on the pump at all times to prevent air from being drawn in to the system.

Modern Style: the modern water pump has a sealed bearing in the front and a leak less seal in the rear. The end play is critical in the modern water pump if the end play gets too great corrosion will develop on the shaft as it moves back and forth and this will cause the seal to leak. (This however may be a moot point as we learned in the modern Leakess water pumps..see Notes on Our Build)



Rebuilding disassembly and Reassembly

1. Unscrew and remove packing nut, and pullout the shaft from the rear. The pack nut can be unscrewed by using a water pump wrench, or by using a screw driver and mallet to tap down on the castles of the pack nut moving it in a counter clockwise direction.



2. Remove felt retainer cup and felt washer from the front, it can be pried out or pulled out. Be careful, as some of old the parts may be need or reused for the rebuild, as modern or reproduction parts often do not fit as well.
3. Through the front tap out the rear bearing, rear felt washer, and felt cup. The bearing race may come out as you are doing this, which is OK, you will be using new parts.

   The next page contains a picture of these parts outside of the water pump housing.

Here you can see the parts out and when reassembled in the pump housing they form a sandwich with the bearing and race as the center. .

4. The rear bearing must be pressed out through the back of the housing. Add a little lubricant to aid in pressing out the bushing.

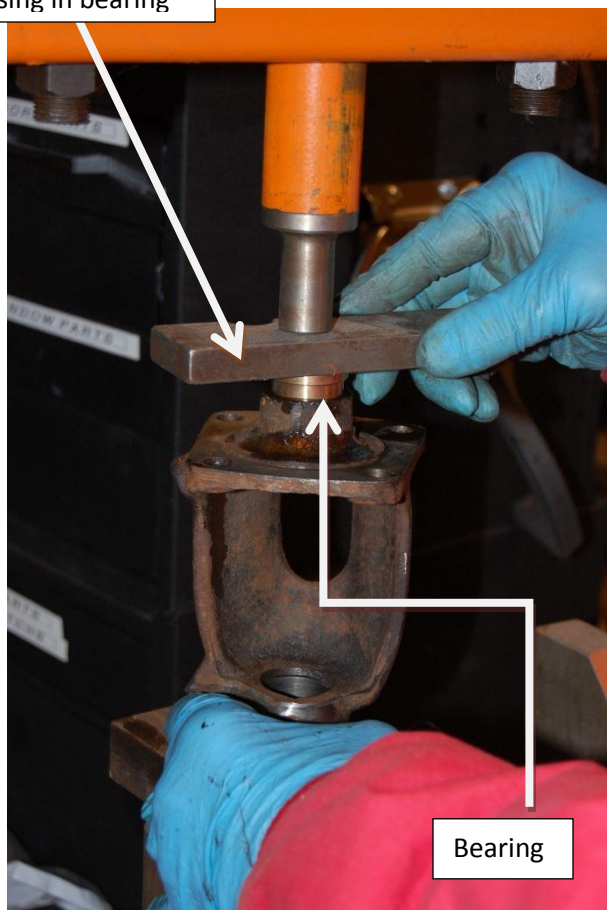
Spray lubricant

5. Your water pump is now dissembled.

Cleaning and Painting

If you are rebuilding one of the Repo-pumps your housing may have some poor casting marks, this is the time to correct these. (Sanding, grinding, and filing.)

This is also the time to clean paint and check for cracks

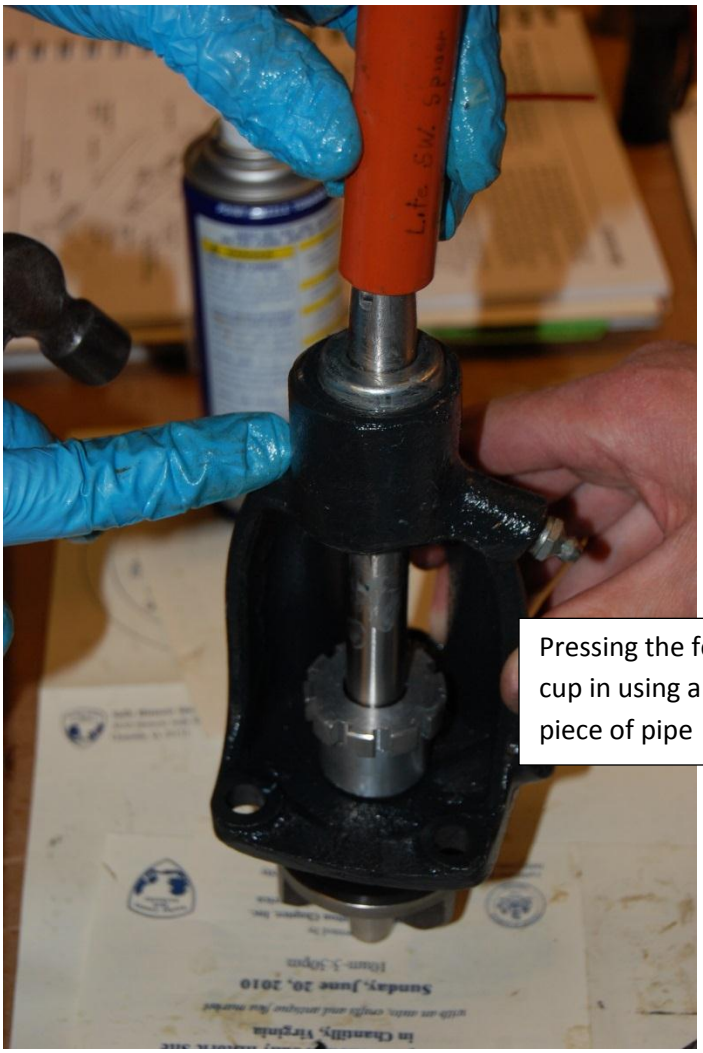


Reassembly

1. Begin by Pressing in the rear bearing. To assist in the pressing spray some wd-40, this will also protect the rubber O-ring from damage. (which is on the leakless rear bushing only?) When pressing in the rear bearing the chance exists that you may crack the housing, to help minimize this risk, lubricate, take your time, and be sure to stop when the bearing flange bottoms out in the pump housing.

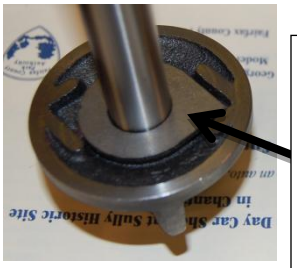
2. Next move to the front of the pump housing. Place the rear felt cup and felt washer in the housing, they may need to be pressed in. (It may be necessary to reuse the old felt cup as the newer reproduction cups are often too tight.) Insert the felt washer followed by the felt retainer and felt washer.

3. Insert the front race and check it with a flash light to verify alignment with the hole in the housing with the hole in bearing race. next grease the fittings to see that the grease is going through the hole in the race, this will assure you that the race is aligned with the housing.



Pressing the felt cup in using a short piece of pipe

4. Place the impeller bushing over the water pump shaft, then take the shaft and insert it into the end of the water pump from there.



Impeller Bushing.

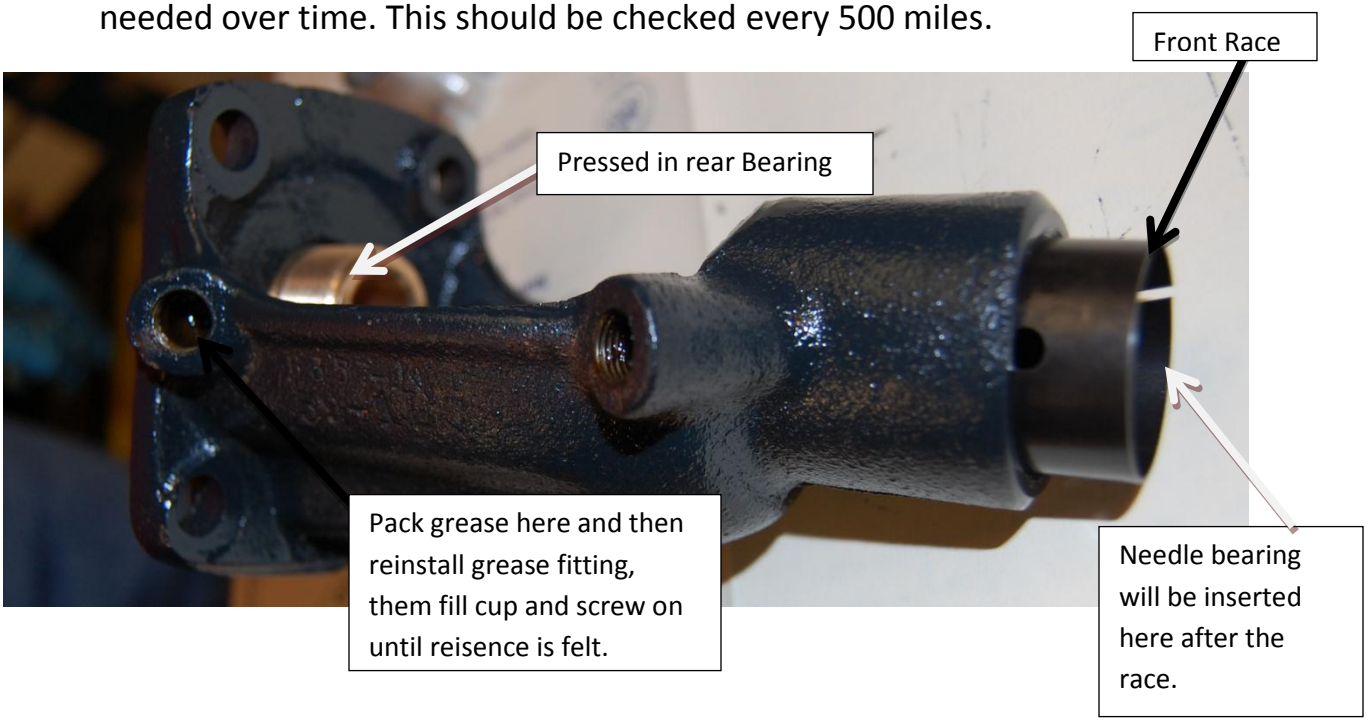
2 TYPEs Brass Square, 28-29,

Steel Tear Drop, 30-31

5. Now insert the needle bearing which has been greased in to the race.

6. Place the felt retainer, felt and washer over the shaft. Using a long deep socket, metal tube, or piece of pipe, slide it over the shaft and tap the felt cup into place. It should be flush, but due to slight manufacturing differences it may be slightly high or even recessed, just consider the depth of the cup and how far it has moved in based on the top edge.

7. Screw in the two fitting and fill the rear cup with water pump grease, screw it until it becomes tight. This will push the grease into the bushing. It may be necessary to repeat this step (filling cup) several times to fill the rear bushing. Once it is full it will become hard to turn, stop there. The remaining grease will be how you will add grease -turning in the screw- as needed over time. This should be checked every 500 miles.



Installation

Do not install the fan blade yet. Make sure that the water pump mounting surface on the head is clear and free of the old gasket. The water pump mating surface should also be clean and ready to install. The radiator should still be tilted away and protected by the cardboard or other shield during installation. The fan blade will be installed after you have cleared up any endplay or clearance issues.

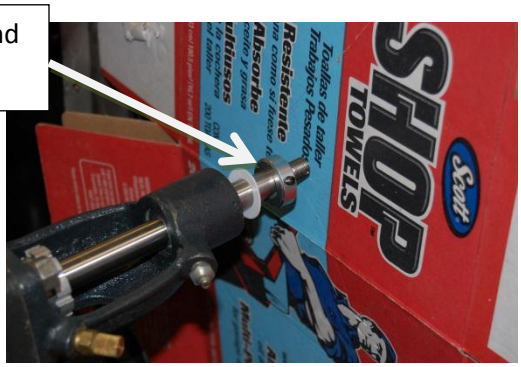
1. Install the water pump first, without the gasket; bolt it down, check for end play and drag. *(Water Pump Shaft End Play should be between .006" to .010", Remember end play is the in-out movement of the shaft).* Drag is associated with the rotation

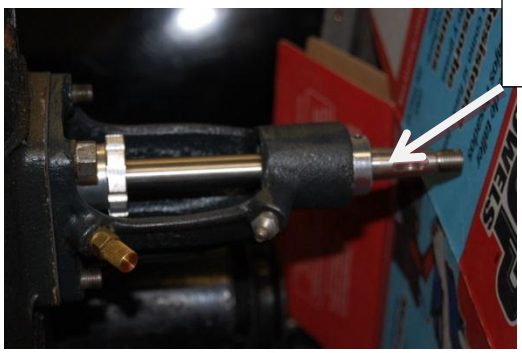
of the shaft; it should drag some but not be extremely difficult to rotate. The final endplay should not touch or "rub" on the boss inside the head, if it does remove the water pump and install the gasket. If your water pump checks out at this point remove it and move to step 3. Step 2 will discuss problems and solutions.

2. There are several possible issues or problems that you can run into when dealing with clearance. Our particular pump took us in three directions before we settled. Here is what you may expect and some possible solutions.
    a. <u>Clearance too tight:</u> Without the gasket our pump was too tight it had no rotation or endplay. With one gasket we still had excessive drag or rubbing on the boss in the head. *Possible solutions* use an additional gasket or grind the end of shaft to fit without dragging.
    b. <u>Clearance too much</u>: We added a second gasket resulting in too much clearance or endplay. Our solution, we decided to go back to one gasket and use a collar. (see Below)
    c. <u>Using a Collar</u>: Since our endplay was dragging on the boss with one gasket and too much with 2 gaskets, we tried a collar. Collars are used to stop excessive endplay into the head boss. We pulled the shaft forward -off the boss in the head-and slipped the collar over

the end and tightened it down, while holding out the endplay. When using a collar check it for possible burs before installing. The collar on our project needed to be filed lightly and sanded before it fit. It will also help to lubricate the collar before you install it.

Collar and washer.





Collar installed

3. If you are satisfied with your endplay and drag, remove the water pump and install the fan blade. Tighten the blade down firmly and install the cotter pin. The blade Tightness should be checked after the first 1000 miles.
4. Install the water pump onto the head surface and tighten down the bolts evenly. Remember the option to replace your water pump studs with bolts. This replacement will allow you to remove the water pump without tilting away the radiator or loosening the hood rods thus making future adjustments and repairs quicker and easier. But with a four blade fan you will still have to tilt the radiator.
5. Reinstall your Fan belt. Tighten the belt by tilting the generator away from the block and tightening its bolt.
6. Reconnect the radiator hoses, hood rods, and fill the radiator make sure the petcock is closed, do not fill above the baffle in top of the radiator. Check for leaks.
7. Check all your connections; be sure they are tight and correctly made. Once you are sure you have installed things correctly, start and test run your car. Remember to listen for noises and check for leaks.

Notes on our Project

When we tried to install the fan blade on our newly rebuilt water pump we ran into a problem. The fan housing would not fit over the pump housing. Reproduction parts often do not fit well. In our case the new aluminum fan blade would not fit onto our repo- pump. The casting of the housing, the taper of the shaft or the taper of the fan housing itself could have been our interference issues. When we began to test our fit and look for our interference we saw that our pump housing was cutting into our fan blade housing. The solution was to grind and or file the housing until the fit was correct. This however was a job for another day. What we decided on was a new Leafless water pump. Interestingly the new reproduction fan blade did not fit on the old repo water pump but did on the new reproduction Leakless. When we installed the pump we found that there was no end play at all in the Leakless. It did not rub on the boss or drag excessively. The lack of any play at all was a question, after all some play is good. The answer was found on the Leakless web site quoted below.

Wear line from pump housing contacting fan housing

"*The stainless steel shaft is machined for a snap ring (fan end) to eliminate endplay.*" http://www.leaklessapumps.com/original.htm

It appears that the New Leakless water pumps have no endplay to worry about and should not rub on the boss inside the head.

An added note, If you are running a alternator on your car, you should install a modern bearing on you water pump because the belt must be tighter to prevent the belt from slipping.

This class was put together by a group of GWC member to help other understand How the Model A”s Water Pump works.