

Replacing the Water Pump In a 1974 Mercedes 450SL © R. Oleson, May 15, 2018

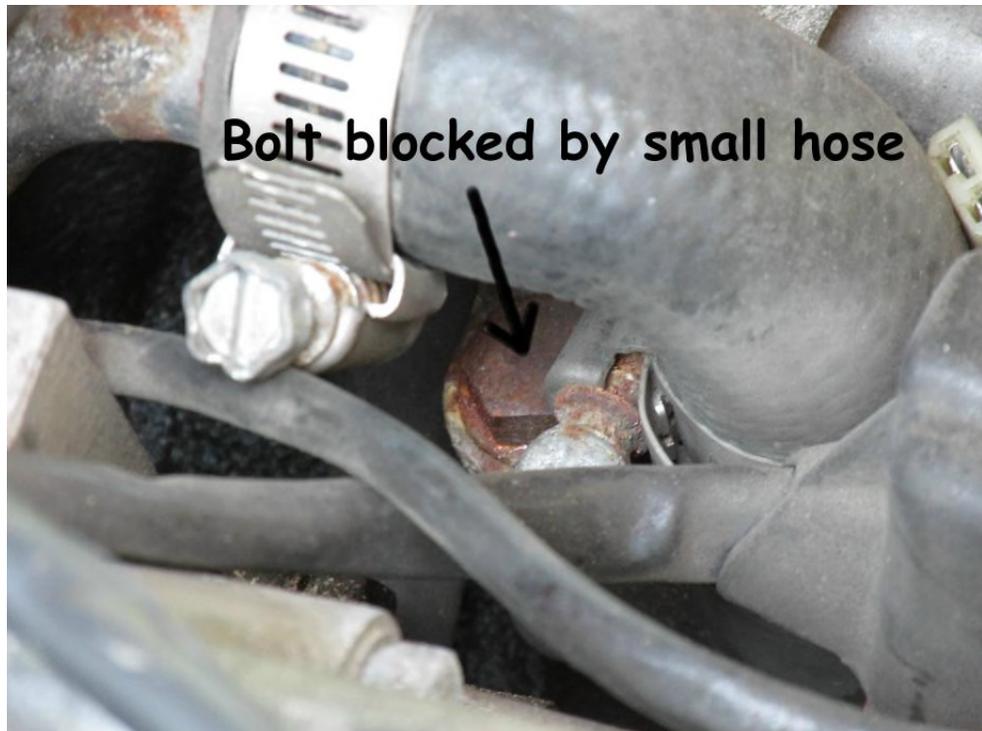
This is based on actually doing it, in a 44 year old car, so it may be closer to reality than some other accounts.

Things you might need:

- New radiator hoses
 - New thermostat
 - New accessory belts
 - 18" pry bar
 - New hose clamps
 - Gasket sealant
 - Clean shop rags or paper towels
 - Large funnel for refilling coolant
 - Old T-shirt to filter coolant during refill if you're reusing the stuff you drain out
 - Wrenches:
 - 13mm for most bolts
 - 8mm for fan shroud
 - 10mm for fan-to-water-pump bolts (This needs to be a LONG HANDLED box/open end wrench: there isn't room for a socket and a standard length wrench doesn't have enough leverage)
 - 14mm for alternator belt adjuster
 - 27mm socket for crankshaft
 - 5mm long Allen wrench for distributor bolt
 - All varieties: Box, open end, sockets, extensions, U-joints, wobble extensions, tilt-head ratchet handles You'll need them all!
 - An inspection mirror
 - A small, bright flashlight
 - A black Sharpie pen
 - You may need a new M8 x 90mm bolt (see 6(b) below)
- *** If you're still using D-Jetronic EFI to run your engine, you may need a new distributor: in mine, the EFI trigger points and their connector to the wiring harness were in very bad condition and got

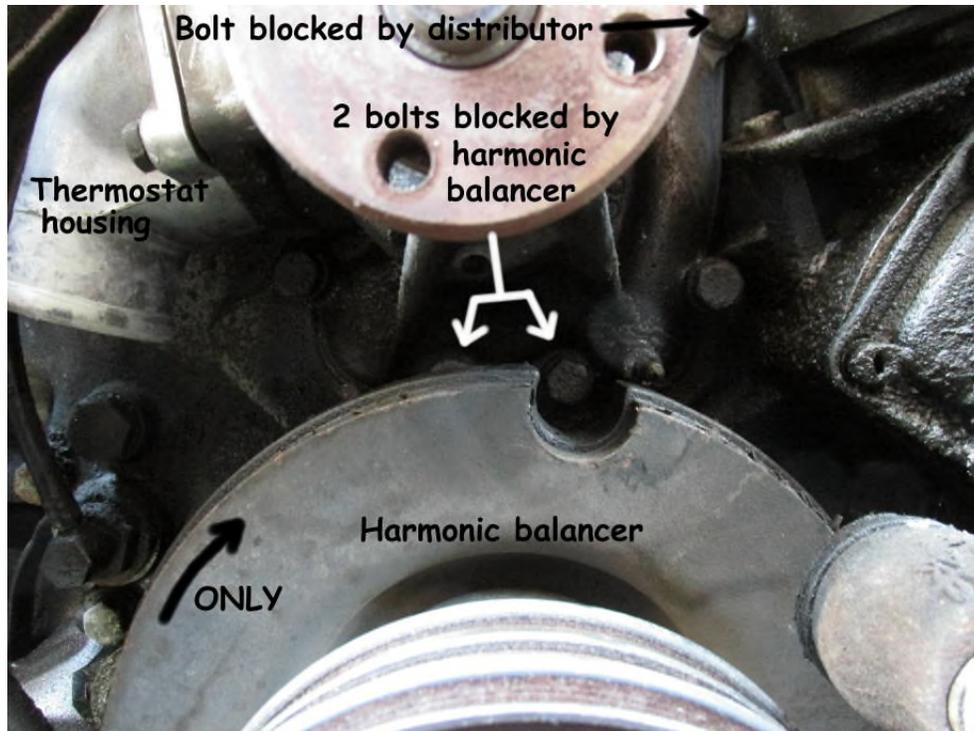
worse with handling. This was not a problem for me, as I am running the EFI on a MegaSquirt computer and don't use the distributor trigger points any more but it is a serious risk if you're running D-Jet on a 44 year old distributor.

1. Drain coolant into a clean container
2. Remove radiator hoses (2" main hoses at top and bottom, 1" lower hose and smaller upper hose from overflow tank)
3. Loosen (don't remove yet) the 4 bolts holding the fan & pulley onto the front end of the water pump. This is easier to do while the belts are still in place.
4. Remove fan belts (Power steering pump has 3 adjuster bolts plus the pivot bolt ... loosen all of these. These belts are tight, so I had to loosen the pump enough to tilt it inward to get the belts off the pulleys) These are all 13mm hex bolts & nuts.
5. Next step is to remove the fan shroud, but it won't come off over the fan. Remove the 2 bolts at the top corners of the shroud, pull it up out of its clips at the bottom corners and let it hang on the fan. Now remove the 4 bolts that you loosened in step 3 above, and pull the fan, pulley and fan shroud all up together and out of the car.
 - a. **SET THE FAN DOWN ON EDGE - DO NOT LAY IT FLAT!**
The hydroclutch on the fan does not like lying horizontally.
6. Remove the upper water pump housing from the pump. This is held on my three M8 bolts, all accessed from above, plus 2 hoses (one 1" hose to the heater, and one very short 2" hose to the engine block). The hose clamps can be fussy to reach.
 - a. There are two engine-lifting brackets attached to 2 of the M8 bolts. The third M8 bolt holds the EFI cable to the distributor
 - b. The bolts are different lengths, mark them for position. In my car, the longest - 90mm - was frozen in place and broke off while trying to remove it. This is not fatal, as the broken end is in the water pump that you're throwing away.
 - c. These bolts are all 13mm hex.



One of 3 bolts holding upper housing on water pump

7. With the 27mm socket, an extension and a long ratchet handle, rotate the crankshaft slowly, **CLOCKWISE ONLY**, until a notch in the edge of the harmonic balancer lines up with the first of 2 bolts at the bottom edge of the water pump.
 - a. You **CANNOT SEE ANY** of this. The 27mm hex is recessed in a deep pulley on the crankshaft, and the bolts in question are under the pump where you can only see if there is no radiator in the car. Holding the mirror and flashlight in your left hand and the ratchet handle in your right, you can get it lined up. The notch is just big enough to pass a 13mm socket through, if you overshoot even a little you'll have to go 180 degrees to get to the next notch.
 - b. Once lined up, remove this bolt.
8. Using the same elegant gear, rotate the crank to line up the notch with the second bolt, which is just an inch or two to the right of the first. Remove that bolt too.

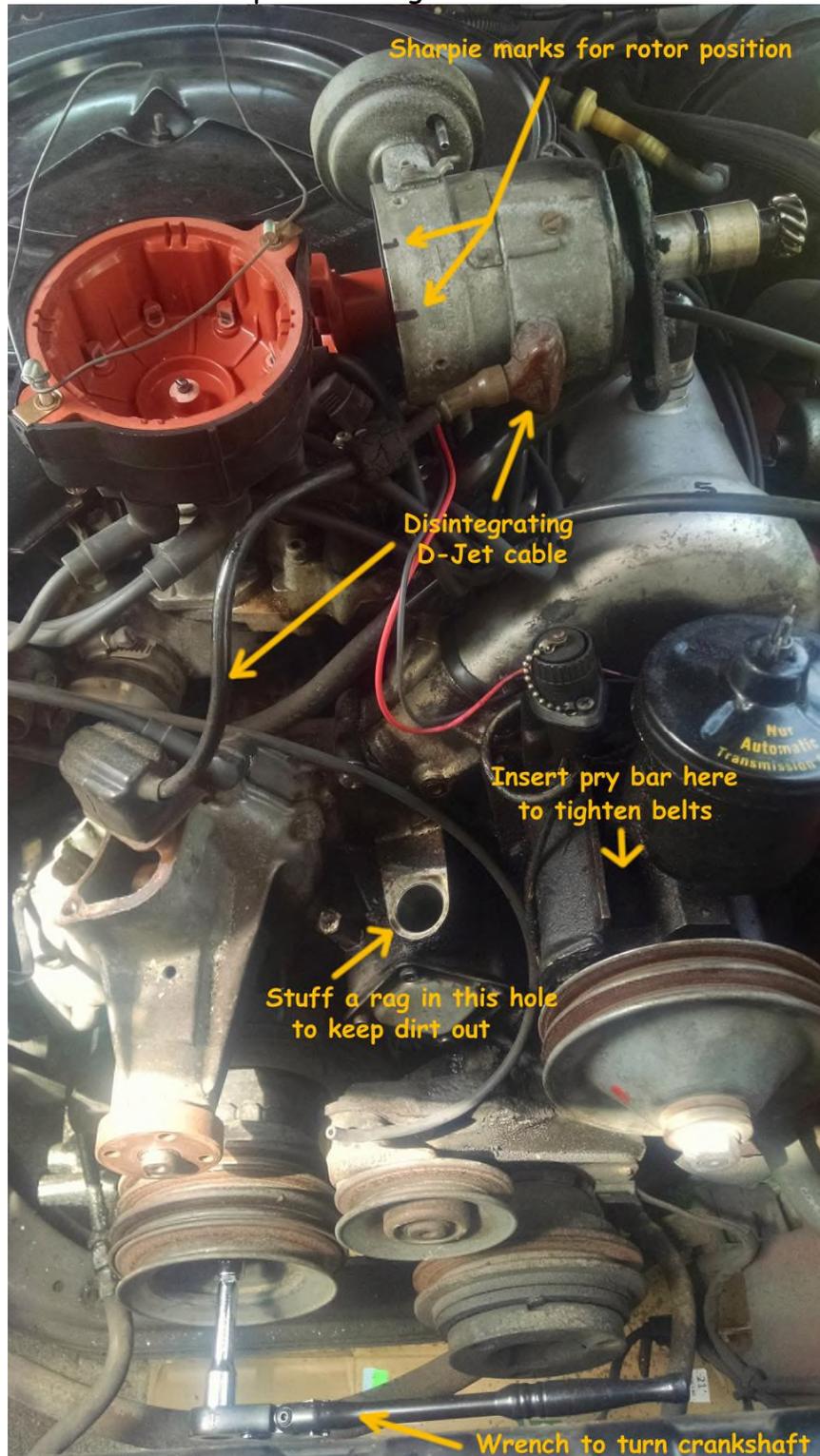


Front view (invisible with radiator in place) showing balancer aligned to remove second bolt at bottom of pump.

Now we've come to the part where you have to remove the distributor. From this point on, **DO NOT ROTATE THE CRANKSHAFT AGAIN UNTIL THE DISTRIBUTOR IS BACK IN.** To be safe, remove the wrench from the crankshaft and hide it in a safe place until you need it.

9. Remove the distributor cap and tie it back out of the way.
10. Note the position of the distributor rotor: With the Sharpie pen, make a mark on the edge of the distributor body exactly in line with the tip of the rotor. Don't let this mark get erased, you'll need it later.
11. Using a very long 5mm Allen wrench (I used an Allen socket attachment on an extension), remove the distributor clamp/adjustment bolt just below the distributor on the side nearest the water pump. (I used a sharp awl to scribe the outline of the bolt and washer on the bracket to help in positioning on reassembly)
12. Pull the distributor up out of the engine. As you pull it up, you will notice that the rotor rotates slightly counterclockwise and stops. With the Sharpie pen, make a second mark on the distributor housing

in line with the rotor tip in the position where it stops rotating. Set the distributor on top of the engine.



Distributor removed for access to water pump bolt

13. Stuff a rag into the hole where the distributor used to be, to keep debris out of the engine.
14. Place a receptacle under the front of the engine to catch more coolant.
15. Remove the remaining bolts holding the water pump, including one that was not accessible with the distributor in place. You may have more coolant come out as you remove these bolts. All bolts are 13mm hex head, M8 bolts, but of different lengths: mark them for position as you take them out. Pull the water pump away from the engine.
16. Stuff rags in 2 holes in the engine block where the pump used to be, to keep debris out of the engine.
17. Clean the old gaskets off, clean out any deposits you find on the front face of the engine inside the gasket flange. Vacuum out any loose debris so it doesn't get in the engine.
18. Remove the thermostat housing from the old pump (three M6 bolts, 10mm hex head). Install thermostat (I'd recommend using a new one rather than reusing your old one) in the new pump. NOTE: there is a little relief valve on the flange of the thermostat ... This should be on TOP, as the thermostat is positioned in the car. Insert the O-ring seal that came with the thermostat, set the thermostat housing in place and tighten the 3 bolts slowly, working in a circle so that the housing stays parallel to the pump flange as you tighten it down.
19. Apply gasket sealant to the back flange of the pump, and apply the gasket to it so that the sealant holds the gasket in place.
20. Remove the 2 rags from the water passages in the front of the engine.
21. Apply gasket sealant to the clean flange on the front face of the engine. Set the pump in place and secure it loosely with 2 bolts.
 - a. Because you can't rotate the crank, there will be one bottom bolt that you can't reach. Save that one for last.
 - b. Insert the 6 other bolts and tighten them down, working in a star pattern to keep things flat and parallel.
22. Remove the rag from the hole where the distributor came out.
23. Insert the distributor back into its hole, with the rotor tip aligned with the second Sharpie mark on the housing. As it goes in, you will see the rotor rotate clockwise until the rotor tip aligns with the first Sharpie mark that you made on the housing. If it doesn't, you have a problem.

24. Reinstall the distributor clamp bolt. If you scribed its outline on the bracket, it should line up nicely with your scribe mark.
25. NOW it's safe to turn the crank. Go find the hidden wrench and 27mm socket, and the flashlight and mirror, and turn the crank **CLOCKWISE ONLY** until the notch in the harmonic balancer lines up with the last remaining empty bolt hole on the water pump. Install this bolt and pull it up tight.
26. Apply gasket sealant to the cleaned flange of the upper water pump housing, and apply the gasket to it so that the sealant holds the gasket in place.
27. Apply gasket sealant to the mating flange on the top side of the pump.
28. Insert the fittings of the upper water pump housing into the 2 hoses and set the housing into place on top of the pump. Remember to include the 2 lifting brackets and the wiring harness as you insert the 3 bolts to secure the upper housing to the pump.
29. Tighten down the 3 bolts and the 2 hose clamps.
30. Set the pulley in place on the water pump shaft.
31. Hold the fan in the opening of the fan shroud and press the shroud down into the clips at its lower corners.
32. Insert the 4 bolts to attach the fan to the pump shaft; do not tighten yet.
33. Insert the 2 small bolts at the upper corners of the fan shroud.
34. Thread 2 V-belts over the fan and onto the crankshaft, power steering pump and water pump pulleys.
35. Use a pry bar to force the power steering pump outward to tension the belts, and tighten one of the adjusting bolts; then tighten the other 2 adjusting bolts and the pivot bolt. (all 13mm hex)
36. Now, go back and tighten the 4 fan bolts with the long 10mm box wrench.
37. Feed the alternator belt over the crankshaft and alternator pulleys and tension it as required (14mm hex on tension adjuster)
38. Install new hoses between radiator and water pump.
39. Refill coolant. If you're reusing your old coolant, filter it through a couple of layers of T-shirt fabric in a funnel You'd be surprised how much crud you'll have in the stuff you drained out.

DONE!