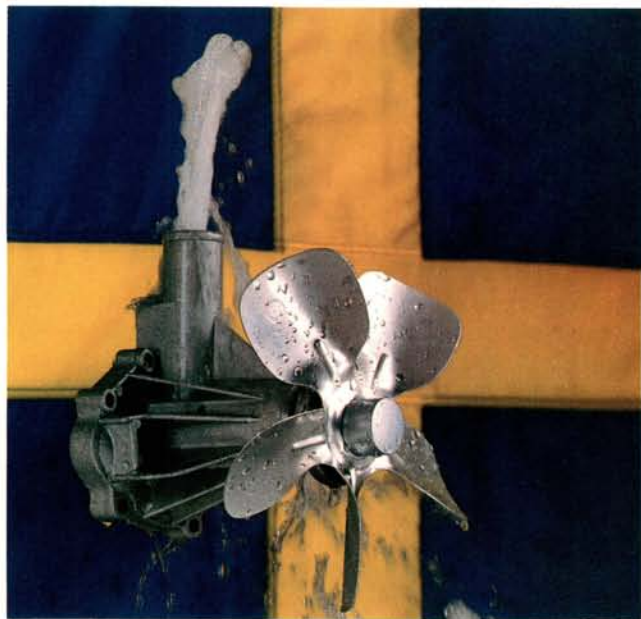


# Vattenpumpar



## Swedish Water Pumps

Can you count the number of water pumps you've replaced over the years? Replacing a water pump is pretty routine as service procedures go. Some might even call it boring. Diagnose the problem, remove the old pump, scrape off the old gasket, then install the new pump. Nothing too exciting about it.

But how many *Vattenpumpar* have you replaced lately? Replacing a *vattenpump* (Swedish for water pump) on some Saab and Volvo models is anything but routine.

### Saab 99/900

Count on our Swedish friends to find a unique way to turn a water pump. The water pump used on Saab's "B" motor needs no drive belt. The pump is mounted internally at the left rear of the block, and is driven by the engine's auxiliary shaft. This was the standard engine on Saab 99s through the end of their production run, but it also found its way into non-turbo 900s through the 1980 model year.

Break an alternator belt? No problem! You can still drive the car as long as the battery holds out with no risk of overheating the engine. Every silver lining has a cloud, however. Since the pump is driven by an internal gear, there's always the chance of coolant and oil coming together in places where they shouldn't. The seal that separates the coolant from the oil can wear out over time, allowing coolant to enter the crankcase.

The gasket sealing the pump's aluminum cover can also split and allow an external coolant leak along the

back side of the block. An owner with this problem should be thankful for the early warning signal and replace the pump before it has a chance to do more serious damage.

### Volvo 240

Volvo technicians call the OHC engine used in the 240 a "B" motor too. Water pump replacement on this engine isn't quite as difficult as it is on the Saab, but there are still some important things to watch for.

Volvo uses two o-rings along with a conventional paper gasket to seal the water pump to the engine. The large o-ring at the top of the pump seals a passage leading to the cylinder head above it. A smaller o-ring at the back of the pump seals a return pipe which runs along the side of the block from the heater core. Coolant leakage at either of these o-ring seals is the most common reason for replacing this style water pump.

Proper installation of the pump requires pivoting the pump upward before tightening its attachment bolts. This seals the upper pump o-ring against the cylinder head. The pump is loosely installed to the block, then pivoted into place using slotted holes in the pump. The pump bolts are then tightened to hold the pump in its pivoted position. The rest of the installation after the pivoting procedure isn't much different from a normal (*non-vattenpumpar*) water pump.

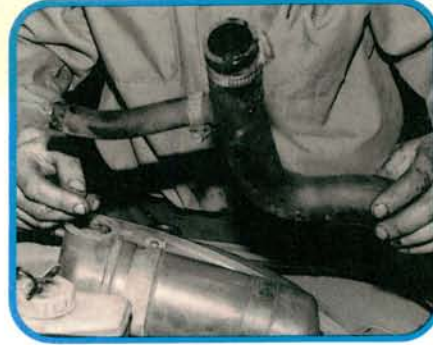
—By Karl Seyfert



1

Saab

Maybe it seems obvious, but removing the negative battery cable is cheap insurance before moving the alternator out of the way. Drain the cooling system until the coolant level is below the water pump. This will prevent an oil/coolant intermix when the water pump is removed.



2

Remove both heater hoses at the firewall. Be gentle here to avoid damaging the heater control valve. To make some room to work, remove the large hose between the water pump and expansion tank. The second heater hose can be disconnected and pushed out of the way temporarily.



3

It's easier to see the coolant leak on the side of the block (arrow) once the hoses are removed. Engine heat can evaporate this type of leak before it hits the ground. Our eagle-eyed Saab specialist spotted the problem during a major service.



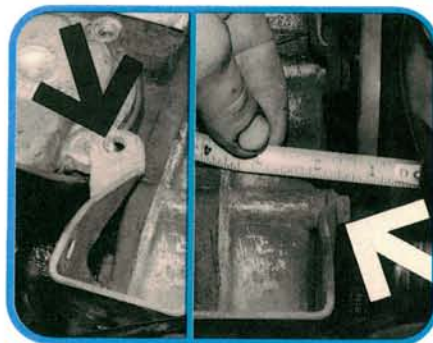
4

Remove the upper and lower alternator mounting bolts, then move the alternator and protective shield out of the way. If you're moving the alternator with its wiring attached, be careful where you set it down. Ten year old plastic injector lines can get pretty brittle.



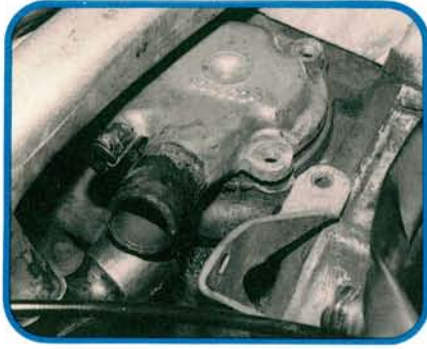
5

Remove the three water pump cover bolts. The third bolt is hidden under the intake manifold. You'll need a box wrench with enough offset to clear the top of the pump cover. Reach under the manifold and turn the bolt by hand once you've broken it loose.



6

The alternator bracket (arrow left photo) must be bent to make room for the pump cover. Before you call us butchers, we'll show you why. This bracket bolt (arrow right photo) is too long to remove without hitting the firewall. We put the tape measure next to it to prove the point.



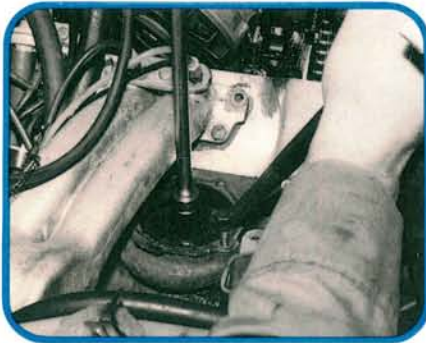
# 7

The pump cover may still put up a fight after the bolts are removed. The aluminum cover often corrodes itself solid in the cast iron engine block. Tapping gently from above and below with a hammer will usually rock the cover free of the block. Be patient!



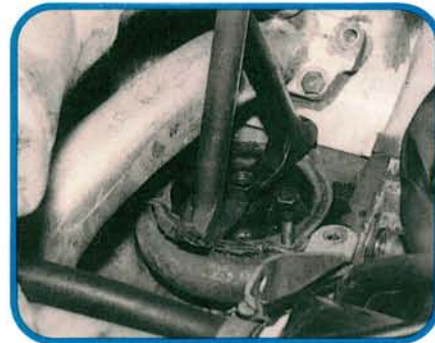
# 8

With the cover removed, grab the impeller and try turning it in both directions. We're checking for wear between the pump and auxiliary shaft gears. Try to remember the way the old pump felt. Use this as a reference when you install the new pump. It will help you tell if the pump gears are engaging properly.



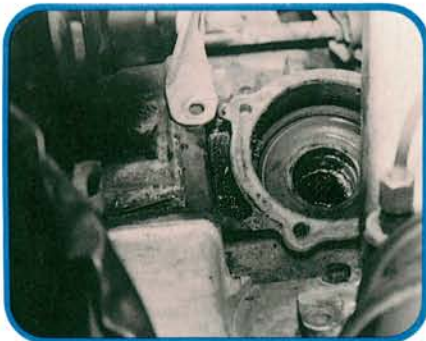
# 9

Lock the impeller in place with a pry bar to avoid damaging the auxiliary shaft gear, then loosen the impeller nut. It's a left-hand thread. To prevent impeller shaft damage, the socket and extension must avoid contact with the intake manifold.



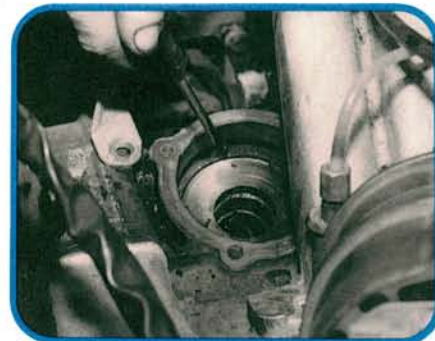
# 10

Leave the nut attached to the end of the pump shaft. Place a pair of ladyfoot pry bars under opposite sides of the nut, then pry gently against the edges of the block to remove the pump assembly. Sludge and corrosion built up in the pump cavity can make pump removal difficult. Take it slow.



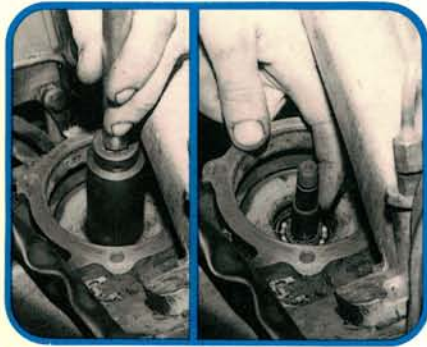
# 11

Our host shop warns their customers before starting a water pump job that they may have to remove the engine if the auxiliary shaft gears are damaged. Turn the engine over to check all the teeth on the auxiliary shaft. A look into the pump cavity showed lots of sludge, but no damaged gears.



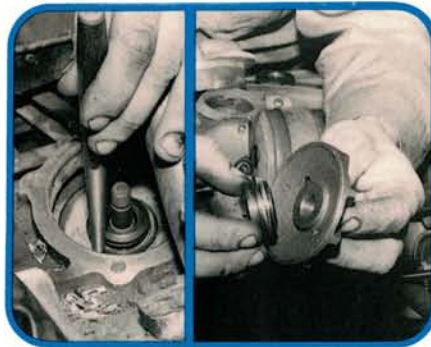
# 12

Clean the water pump oil seal, coolant seal, and shaft bearing mating surfaces on the inside of the block. A little extra time spent here will ensure a good seal and prevent binding when the pump is reinstalled. Cover the pump opening with a rag, then scrape the old pump cover gasket off the block.



# 13

Sand the anti-rust coating off the new pump shaft's mating surfaces, then install the new pump bearing and lock clip. Lube the shaft gears, then use a socket and driver to drive the shaft and bearing into the block. Stop often to turn the shaft and check for binding.



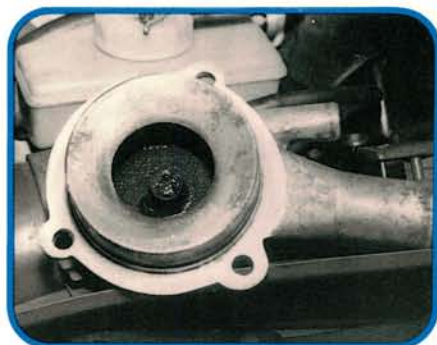
# 14

Install the pump's oil seal next. Drive the seal (left photo) into the block until it bottoms on the shoulder in the block. Next, install the spring-loaded coolant seal and pump impeller (right photo). The photo shows the proper direction to install the coolant seal.



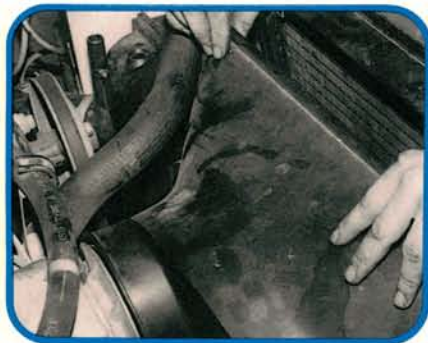
# 15

The left-handed nut wedges the pump impeller on the tapered pump shaft. Wedge the impeller with a pry bar to keep it from turning, while slowly tightening the shaft nut. Once the shaft nut is tight, remove it. This will keep it from backing off and wedging under the cover later.



# 16

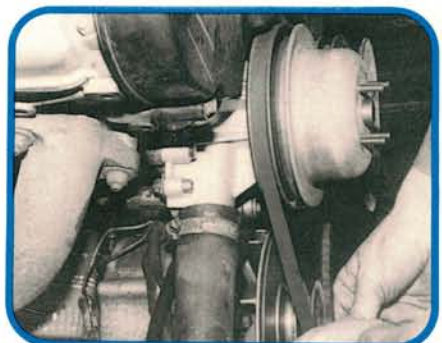
Remove any corrosion from inside of the pump cover and clean its gasket mating surfaces. Install a new gasket, then reinstall the cover. Bend the alternator bracket back into place, then install the cover bolts. Tighten the bolts evenly to avoid cocking the cover. Reinstall all remaining parts.



# 17

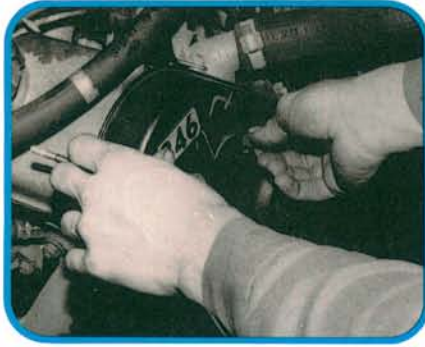
**Volvo**

Open the radiator and engine block petcocks and drain the cooling system. Remove the four water pump-to-fan nuts and lay the fan aside. Remove the two bolts holding the fan shroud to the radiator. Cut the tie wrap holding the air intake hose to the bottom of the shroud, then remove the shroud.



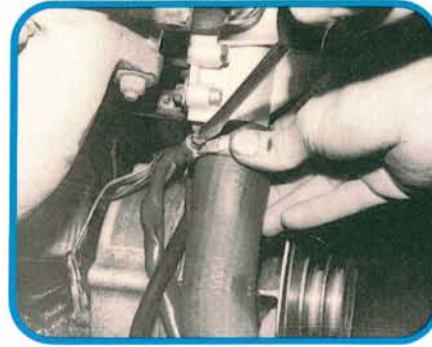
# 18

Loosen the pinch bolts and screw-jack adjusters on the alternator, power steering, and air conditioning, then remove all three belts and the water pump pulley. Refer to our November 1989 "Volvo Timing Belt" feature for information on Volvo's pre-1984 A/C compressor belt adjustment system.



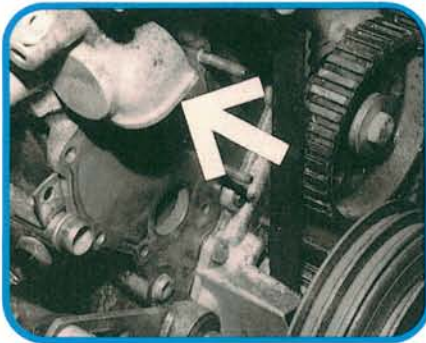
# 19

The water pump can be replaced without removing the upper timing belt cover, but the pump's a lot easier to reach with the cover out of the way. Remove the three bolts from the front of the cover. Don't forget the small Phillips head screw that attaches to the rear of the cover near the valve cover.



# 20

Remove the lower radiator hose at the pump and move it aside. Remove the nut and bolt holding the return pipe to the rear of the water pump. Remove the remaining water pump bolts, then remove the water pump. The extra time spent with the timing cover gives you a clear shot at the pump bolts.



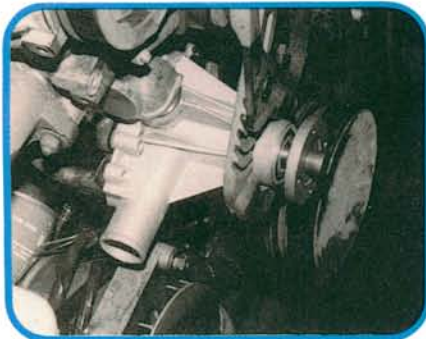
# 21

Scrape the water pump mounting surface on the block. Clean and inspect the o-ring sealing areas at the cylinder head and return pipe for corrosion. Antifreeze may have eaten away the aluminum head. A new water pump and o-rings won't prevent new leaks if there's damage in these areas.



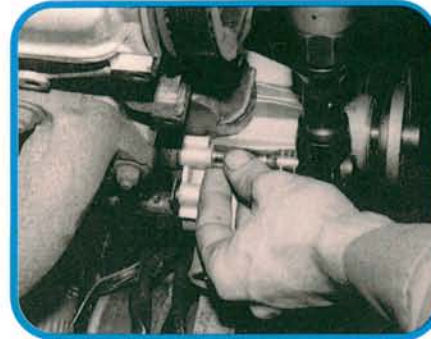
# 22

Install the paper gasket and o-rings on the new water pump. The o-rings should be installed without gasket sealer. This photo shows the slotted pump mounting holes. Install the water pump nuts and bolts tight enough to hold the pump, but loose enough so that it can be pivoted into position.



# 23

It takes a two handed approach (or an accomplice) for the next step. Grab the snout of the water pump with a large pair of slip joint pliers and pivot the pump upward until the o-ring seals snugly against the cylinder head. Hold the pump in this position while tightening the mounting bolts.



# 24

Tighten all water pump bolts evenly. Don't forget the nut and bolt holding the return pipe to the rear of the water pump. Reassembly from here on out is a reverse of disassembly. We forgot to transfer the water pump studs from the old pump. It's easier to do with both pumps on the bench.