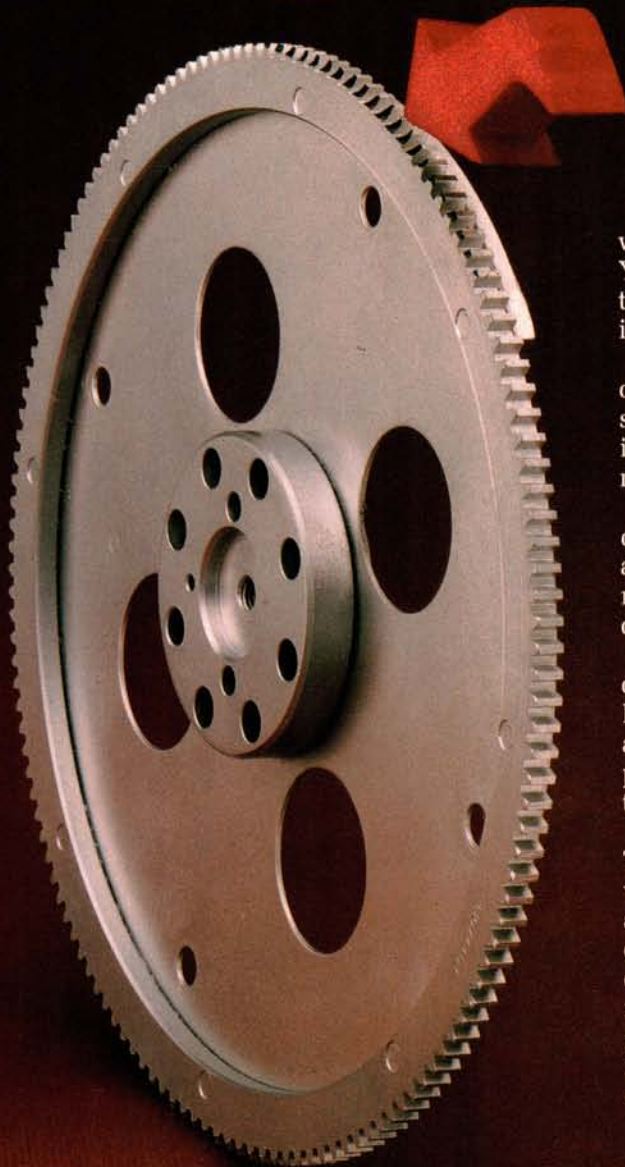


Saab Flywheel Replacement



Have you ever tried your luck at the roulette wheel or a carnival wheel of fortune game? You spin the wheel and hope for the best. But the wheel never seems to stop where you want it to, does it?

Unlike these games of chance, the flywheel on a four cylinder engine will almost always stop at the same two positions each time the ignition is turned off. If you were playing roulette, you could pick a winner every time.

When the engine is restarted, the starter drive teeth engage the same few flywheel teeth at the same two spots on the flywheel. After many spins of the wheel, this metal-to-metal contact causes the flywheel's teeth to wear.

Flywheel ring gear and starter drive wear can be a problem on just about any car. Because of their lightweight construction, automatic transmission flywheels seem more prone to problems in this area. Why do you think they call them flex plates?

It's hard to stop the process once it's begun. The starter drive teeth get less of a grip on the worn flywheel teeth, so both sets of teeth wear a little bit further. Finally, the starter drive can't completely engage the flywheel teeth to crank the engine. At this point, turning the ignition key only produces expensive-sounding grinding noises. When things get this bad, a new flywheel and starter drive are the only cure.

Wheel of Misfortune

The usual flywheel replacement procedure is to remove the engine or transmission (whichever is easier), then replace the flywheel. Pretty simple and straightforward.

If you're familiar with the manual transaxles used in Saab 99s and 900s, you already know that the flywheel or clutch can be replaced without removing the engine or transaxle. You can do the whole job without disturbing either one. We detailed the clutch replacement procedure for these cars in the February 1989 *Import Service*.

This feature doesn't carry over to Saab 99s or 900s that are equipped with an automatic transaxle, however. There's just no way to replace the automatic transmission flywheel in either model Saab using the manual transaxle techniques. Separating the engine and transaxle in the car to remove one or the other is also impossible. Complete powertrain removal is the only option.

Piggyback Powertrain

The upper section of the Saab 99/900 aluminum transaxle housing does double duty as the engine oil pan. The engine is bolted directly to the top of the transaxle, with only a gasket separating the two. The flywheel and torque converter are mounted at the front of the engine. Power from the engine is delivered to the transaxle by the torque converter through a set of transfer gears and a chain at the front of the transaxle.

This makes for a compact powertrain package, but one that must be disassembled and reassembled carefully. The torque converter and flywheel are mounted in very close quarters between the engine and

transmission. When the engine and transmission are separated or joined, the engine must be moved straight up or down to prevent damage to the torque converter, engine oil pickup tube, engine-to-transaxle gasket, or other powertrain parts.

Most Saab specialists will tell you (but probably not their customers) that removing, disassembling, and installing a 99 or 900 engine and automatic transaxle assembly really isn't such a big deal. After you've been through it once or twice yourself, you probably won't approach the job with too much apprehension either.

Organ Donor

A few words of explanation about the "Frankenstein" Saab 99 we used for most of our photography. The car's original engine and manual transaxle had been removed and replaced with a fresh engine and an automatic transaxle several months earlier to accommodate the owner's pregnant wife. She just wasn't interested in rowing through the gears in her enlarged condition.

After the baby was born, the owner's thoughts turned to a more practical "family car" for his wife to drive. He knew that the resale value of his otherwise healthy 99 would be lowered if it were equipped with an automatic transaxle. The decision was made to pull it back out, and that's where we came in.

We'll point out the differences between 99 and 900 flywheel replacement procedures and other important items as we remove the 99's well-worn flywheel.

—By Karl Seyfert



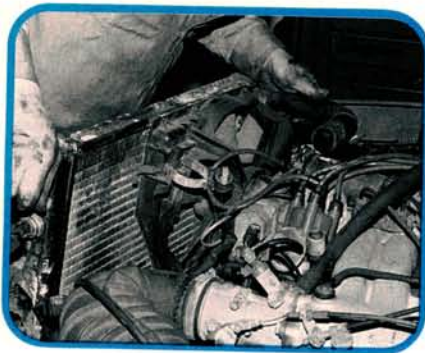
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Removing the transmission shift cable can be a real battle on pre-1978 Saab 99s. We chose to remove the cable at the shifter end, then snake the cable through the firewall. It takes a little more time, but there's more room to work. A special socket is needed to remove the anti-theft shifter housing bolts (arrow).



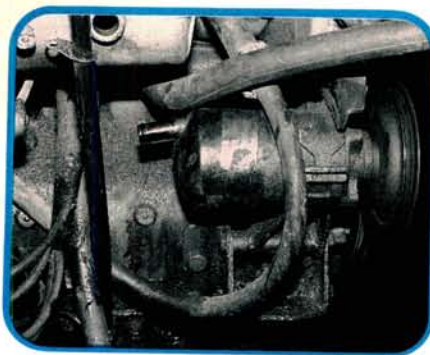
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The transmission cooler is mounted in the upper radiator hose (arrow). We disconnected the upper hose, then left the cooler and fluid lines attached to the transaxle. This gave us some extra room on the left side of the engine and also prevented unwanted transmission fluid baths.



3

Space is also cramped at the front of the engine compartment. Remove the radiator and cooling fans. We squeezed the powertrain past the A/C condenser. You'll probably want to move it out of the way to be safe. There's more room to work on the 900. The radiator and condenser can stay where they are.



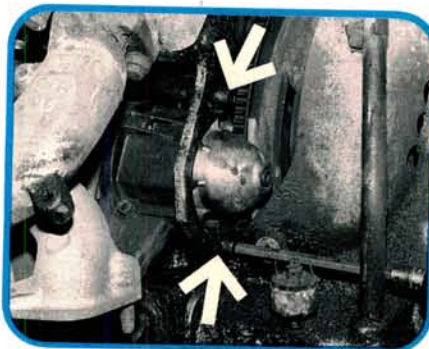
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All 99s and 900s equipped with automatic transmissions also have power steering. Remove the power steering lines at the pump. On 99s, remove the air conditioning compressor. Discharge the system, then remove the compressor lines on 900s. Remove all upper engine electrical, cooling system, and fuel system connections.



5

The rest of the removal procedure is similar to a manual transmission model. Remove both inner CV joint boot clamps and the speedometer cable. Remove the right ball joint bolts, then slide the right side drive axle outward. Hold it in position with a block of wood. Remove the engine mount nuts and transaxle ground cable.



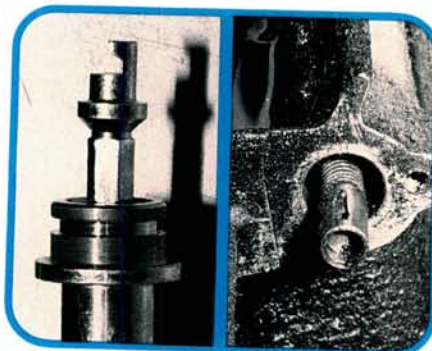
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We lifted the powertrain part way out before removing the starter wiring that's hidden under the exhaust manifold. The hex-headed starter mounting bolts are also much easier to reach after the powertrain is removed. Don't forget the starter motor heat shield during reinstallation.



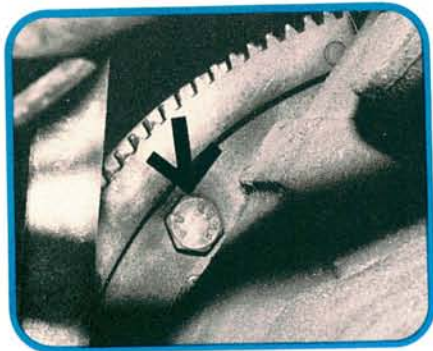
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Remove the shift cable now if you're disconnecting it at the transmission. Pre-1978 shift cables require this special tool to release the cable's retaining spring. If you don't have the tool, you're better off removing the cable at the shifter end.



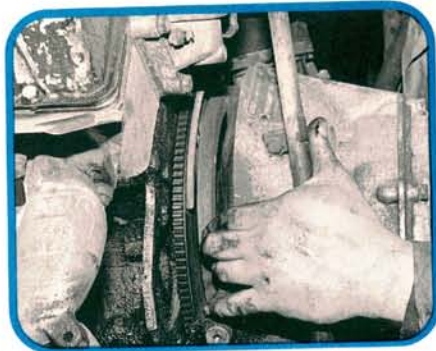
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Later 99s and all 900s have a simplified shift cable removal procedure. This hook at the end of the shift cable (left photo) interlocks with a matching hook in the transmission. A spring loaded sleeve (right photo) covers both hooks and keeps them engaged. Slide back the sleeve to remove the cable.



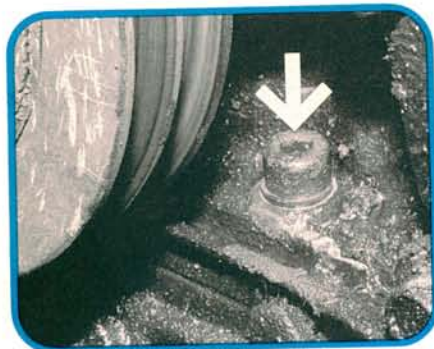
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Reach under the intake manifold with a long extension and socket to remove the flywheel-to-torque converter bolts. Early flywheels have four torque converter bolt holes, while more recent models have eight. Bring the converter bolts into position using the crankshaft pulley bolt.



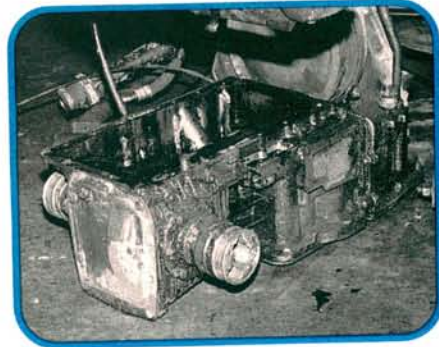
10

Separate the converter from the flywheel, then move the torque converter as far from the flywheel as possible. Now turn the crankshaft until the flywheel timing mark plate is in the seven o'clock position. It's a tight fit and we need all the room we can get to separate the engine and transaxle.



11

Remove the engine oil dipstick tube bolt at the intake manifold. Remove most of the engine-to-transaxle bolts. This hex-headed bolt is hidden behind the crankshaft pulley (arrow). Remove the pulley to reach the bolt. Leave a few bolts in place until you're ready to separate the two units.



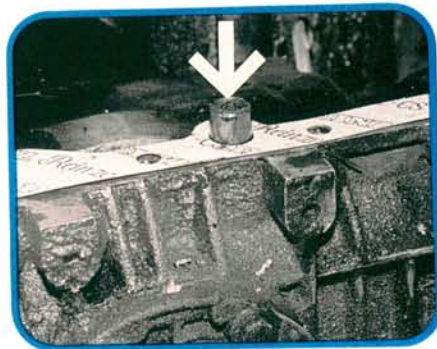
12

Lower the powertrain to the floor or onto a sturdy workbench. Remove the rest of the engine to transaxle bolts, then separate the two units. Lift the engine carefully to avoid snagging the flywheel on the torque converter or damaging the engine oil pickup tube.



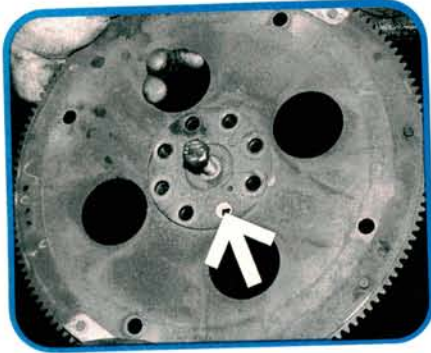
13

Clean the torque converter's centering dowel with sandpaper. The pin fits very tightly in the center of the flywheel. Dirt or rust may keep the converter from properly seating against the flywheel. This can cause vibration problems. The extra wobble may also damage the converter seal and bushing.



14

Transfer both dowel pins to the transaxle. This makes it easier to line up the two units during reassembly. Remove the old gasket, then clean the engine and transaxle gasket mating surfaces. Make sure everything is extra clean for a good seal. Oil leaks are a common problem in this area.



15

The center of the flywheel is threaded. A bolt can be used to push the flywheel off the end of the crankshaft if necessary. Check the crankshaft seal for signs of leakage. The small eighth flywheel hole (arrow) matches the crankshaft timing marks.



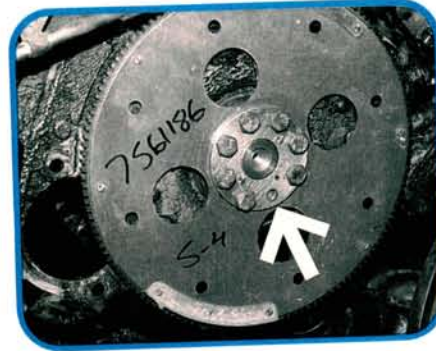
16

You can see the damaged flywheel teeth in this photo. The flywheel also had a similar damaged area 180 degrees opposite this one. The rest of the flywheel teeth looked almost new. The replacement flywheel had a slight chamfer on the teeth which should help them last a bit longer.



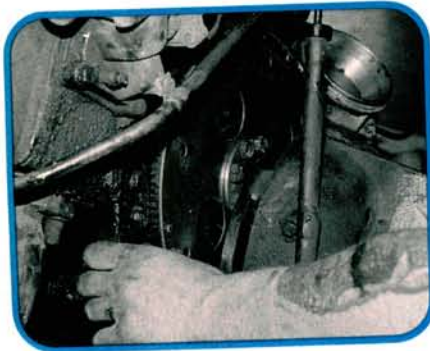
17

Apply thread locker to the flywheel bolts, then torque them evenly to 60 Nm (44 ft-lb). Use a flywheel lock (arrow) or flywheel turner to hold the flywheel. This updated flywheel can be identified by its eight torque converter mounting holes.



18

We keep talking about the lack of room on this job. Position the flywheel as shown to avoid bending the flywheel timing plate or other parts during reassembly. The torque converter centering dowel will barely squeeze through the gap between the flywheel bolts in this position.



19

Have a friend operate the engine hoist while you guide the engine back into position on top of the transaxle. Take your time to avoid damage to the engine's oil pickup tube. Reinstall the engine-to-transaxle bolts, then torque them evenly to 20 Nm (15 ft-lb). Reinstall the crankshaft pulley.



20

Always replace the damaged starter drive. The starter drive retaining ring and collar at the end of the armature shaft is very similar to a General Motors design. Bench test the rebuilt starter before reinstallation. The starter is a lot harder to remove and install when the engine is back in the car.