Handyman's Special

Have you ever spent a Sunday morning reading through the automotive classified section of your local newspaper, looking for a four wheeled project? You know the type, don't you? After a glowing description of the car's many positive features, the ad will often close with the cautionary phrase "needs minor repair" or "Handyman's Special?"

These phrases can be used to describe a multitude of automotive ailments. Alarm bells should be going off in your head when you read them. The vehicle in question could be in need of anything from a new set of tires to a complete engine overhaul. It all depends on how realistically the owner has interpreted the car's condition.

You probably won't find many Subarus in the classified section that fall into the fix 'er upper category. To their owners, Subarus represent an entirely different kind of Handyman's Special. The kind of rugged vehicle that you wouldn't be afraid to load up with building materials to finish a home improvement project on a Saturday. Or use for a quick trip to the feed store. All in a day's work for a Handyman's Special.

Mix and Match

This time around we'll be looking at maintenance and repair tips on 1985 and later Subaru "L series" models (GLs, DLs, GL10s, and Loyales). The L series has been the backbone of the Subaru line for many years. L series sedan, wagon, and coupe models have been offered with either two or four wheel drive. Carburetors, fuel injection, and turbos have all been used over the years in various combinations with different body styles and drive systems.

So many Subaru variations might seem like a lot to tackle in a single article. Despite their obvious differences, L series Subarus are really quite similar. All use the same engine design, regardless of what system is used to get the fuel to the cylinders. Drivetrain and suspension components are also very similar, with the major differences being between two and four wheel drive models.

Instead of getting bogged down in differences, we'll concentrate on the things that all L series Subarus have in common. Our maintenance information applies to all L series cars, unless explained otherwise.

Pancake Power

One look under the hood will tell you that Subaru engines aren't like the rest. The trademark horizontally opposed four cylinder Subaru engine was updated for 1985 by adding two overhead camshafts, one for each bank of two cylinders. Two separate-crankshaft driven timing belts turn the camshafts.

Replacing the timing belts might be your first maintenance experience with a late model Subaru L series. An all aluminum engine and two timing belts instead of one make for a more complicated belt replacement procedure. Subaru has recently changed the recommended belt replacement interval from 60,000 to 50,000 miles. The belt material has also been changed to improve durability and reduce belt noise.

The correct timing belt replacement procedures must be followed to ensure maximum timing belt service life. When installing new timing belts, always rotate the crankshaft in a clockwise direction at least three times prior to tensioning. Belt tension must be adjusted on a cold engine. Special tools are available to ensure that belt tension is correctly adjusted. Overtensioning may cause premature failure. We don't recommend adjusting belt tension by feel.

Used timing belts can be retensioned, but if the vehicle mileage is close to the recommended belt replacement interval, belt replacement is a better option. The extra tension may be enough to break the old belts. This engine isn't a valve bender, so a broken belt means a tow truck ride, but no internal engine damage. For a complete explanation of Subaru OHC timing belt replacement procedures, refer to the January 1989 issue of *Import Service.*

Some 1985 and early 1986 L series models had problems with weak valve springs. During high RPM operation at cold engine temperatures, these valve springs may allow the valves to remain partially open, causing a loss of power. This problem was more common on turbo models, especially when recommended oil change intervals were neglected.

These valve springs were replaced with updated springs having higher spring tension during mid 1986 production. Updated springs can be identified by a green paint stripe. The updated valve springs can be installed on earlier models to cure the power loss problem without additional modification.

Hill Holder

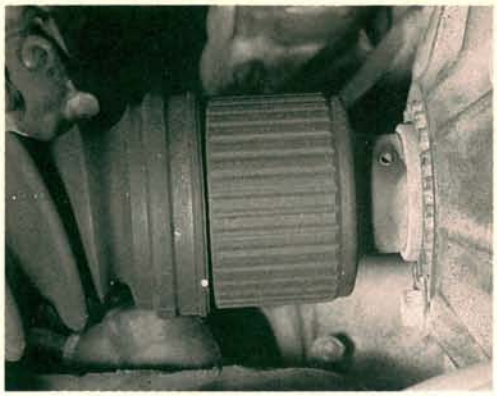
A routine clutch adjustment has an added twist on Subarus. All manual transmission models have a feature called a Hill Holder. With the clutch pedal depressed, the Hill Holder maintains brake hydraulic pressure after the brake pedal is released. This keeps the vehicle from rolling backwards when stopped on an incline. For proper operation, the Hill Holder cable must also be adjusted each time the clutch cable is adjusted.

The Hill Holder can be confusing to someone who has never adjusted it before. One easy way to keep things from getting out of whack is to turn both cable adjusting nuts the same number of turns during the adjustment. If you loosen the clutch cable nut by two turns, then tighten the Hill Holder nut by two turns. This should keep your adjustment in the ball park.

Use the following procedure to adjust the clutch cable and Hill Holder:

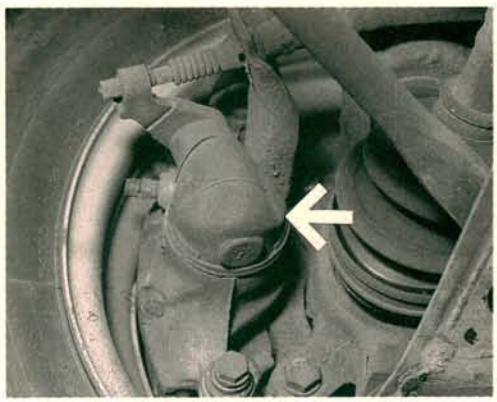
- Adjust the clutch arm free play to specifications.
- Make sure the cable moves freely without binding and that there is no wear in the clutch pedal mechanism. You may have the free play properly adjusted at the clutch arm, but if the linkage is worn or the cable is binding, the release arm may not have enough travel to completely disengage the clutch. This will cause difficult gear selection and transaxle wear.
- Drive the vehicle to an incline of three degrees or more.
- To hold the vehicle on the incline, fully depress both the clutch and brake pedals. The vehicle should not roll back when the brake pedal is released.
- The brakes should release just before the clutch begins to engage. If the brakes release too soon, the car may roll backwards before the clutch has a chance to engage.
- If the vehicle rolls back before clutch engagement, tighten the Hill Holder adjusting nut slightly and retest.
- If the brakes release too late, the engine will fight the brakes to get the car moving forward and may stall. Unnecessary clutch lining wear will result.
- Loosen the Hill Holder adjusting nut slightly and retest.

—By Karl Seyfert



1

Inspect the inner and outer drive axle boots on front and rear axles during oil changes. Several different drive axle designs have been used. Drive axles can be identified by the number of rings on the axle, cooling grooves on the inner joint, and the number of splines on the inner joint. Match up replacement parts carefully.



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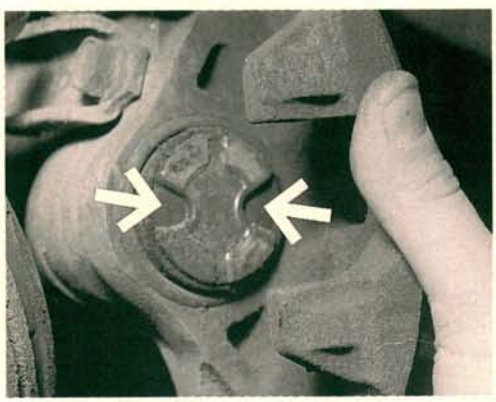
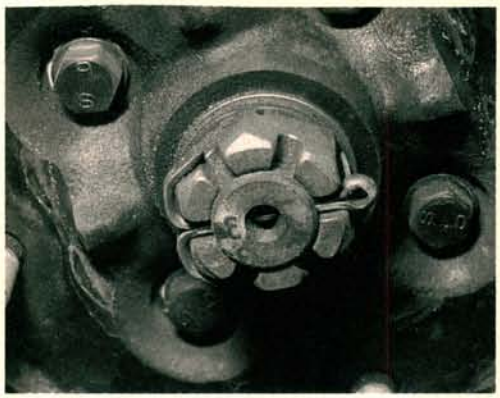
The front calipers include the parking brake mechanism. At the same time you are checking the CV boots for tears, check the rubber parking brake boots at the back of the calipers. Torn caliper boots will leak lubricating grease and let water in, preventing proper parking brake operation.



3

A parts store of our acquaintance had a rash of "bad" Subaru front calipers. It seems the technician who was condemning the parts didn't know that the caliper piston must be turned clockwise to retract it into the caliper. A large C-clamp should not be used to retract the piston.



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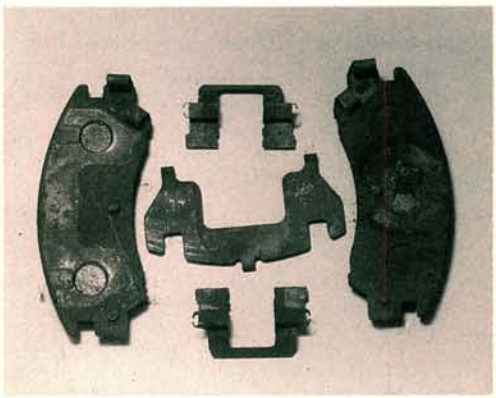
Front wheel bearings will wear out quickly if the hub nut is not properly torqued. Always tighten the hub nut to the recommended torque setting during rotor or drive axle service. If the castle nut slots don't line up, the nut may be tightened up to an additional 15 degrees.



5

Inspect the condition of all brake hardware during brake jobs. Original equipment and premium front pad kits include new shims and the correct high temperature lubricating grease for the job. Front brake squeak can often be traced to pad hardware that is damaged, improperly lubricated, or missing.

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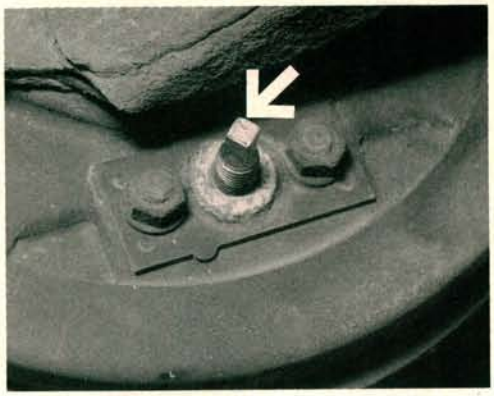
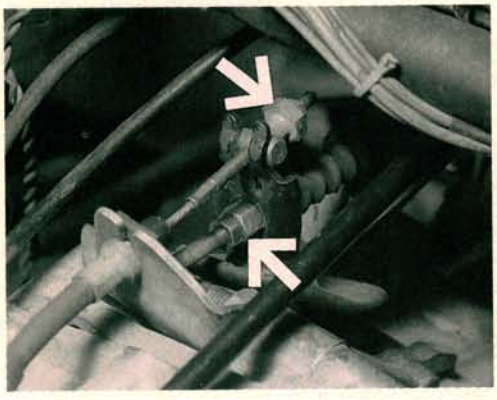
Rotor and drum resurfacing shouldn't be considered mandatory with every pad or shoe replacement. Check for deep scoring, then measure runout, taper, parallelism, or thickness variations. New pads or shoes should work fine if these measurements are still within specifications.

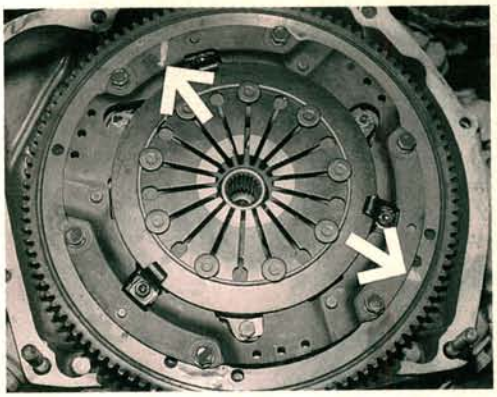


Rear brakes normally last a very long time. The primary shoe gets most of the wear. Rear brakes are manually adjusted on FWD models. Remove the protective boot and turn the square adjuster clockwise to take up for brake shoe wear. Four wheel drive models have self-adjusting rear brakes.

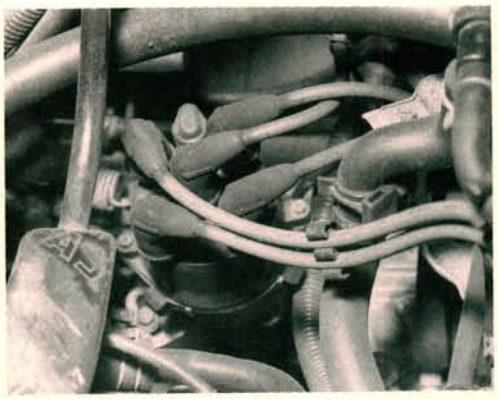
Regular tire rotation is especially important on 4WD models. Uneven front to rear tire wear may cause 4WD engagement/disengagement problems. Tires must be the same number size and diameter (a good reason for replacing tires in sets of four). Unequal tire diameters will also cause accelerated tread wear on On Demand systems.



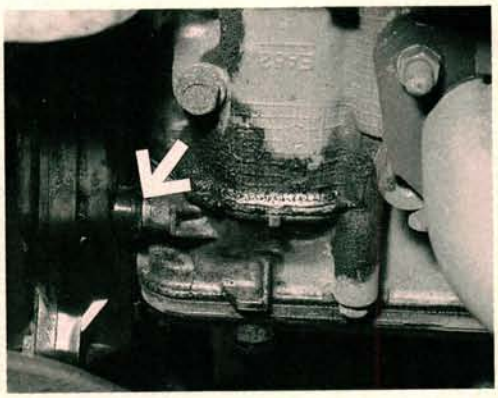
Hill Holder and clutch free play adjustment can be confusing the first time around. Just remember that if the clutch cable is loosened, you'll need to tighten the Hill Holder cable by an equal amount. A properly adjusted Hill Holder will release the brakes just as the clutch begins to engage.



The pressure plate must be properly indexed during clutch service. The flywheel and pressure plate have painted balance marks along their outer edges (arrows). Do not line up these balance marks. Instead, install the pressure plate with the marks 120 degrees away from one another.



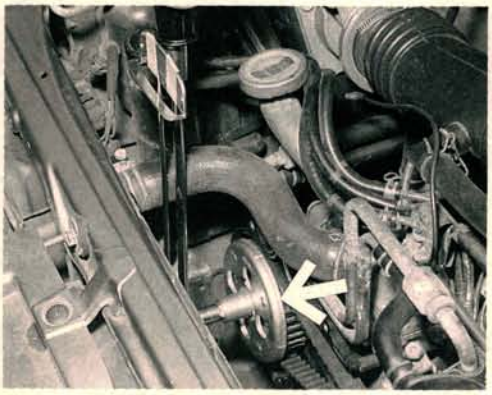
An engine knocking noise that sounds like it's coming from the distributor could be caused by a loose left timing belt. Pushing on the distributor may change the pitch of the noise. The loose cam belt causes the camshaft drive gear and distributor driven gear to chatter against the camshaft drive gear.



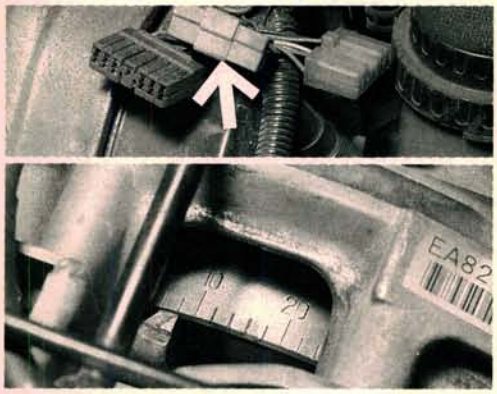
Our donkey car had the characteristic distributor noise and was close to the recommended timing belt replacement interval. We noticed a small oil leak from both camshaft supports (arrow) and decided to take care of these while replacing the timing belts. The rest of the engine looked dry.

We used this factory flywheel lock to remove and reinstall the crankshaft pulley bolt. The flywheel lock's dowel pin engages a hole in the flywheel. The flywheel timing notches and timing pointer used for timing belt installation and tensioning are visible to the left of the flywheel lock.

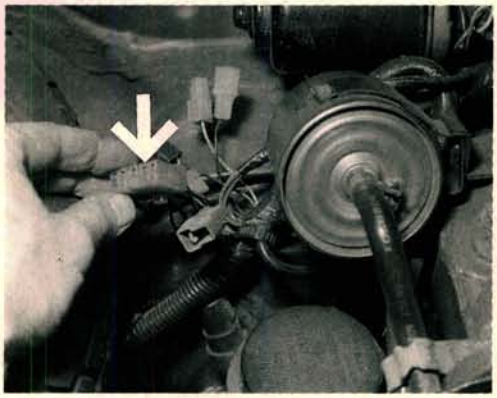
One camshaft support bolts to the front of each camshaft case. The o-rings that seal the supports to the cases may cause oil leaks in this area. Engine heat causes the o-rings to harden and compress. We replaced the o-rings and lip seals at both camshaft supports to prevent future oil leaks.



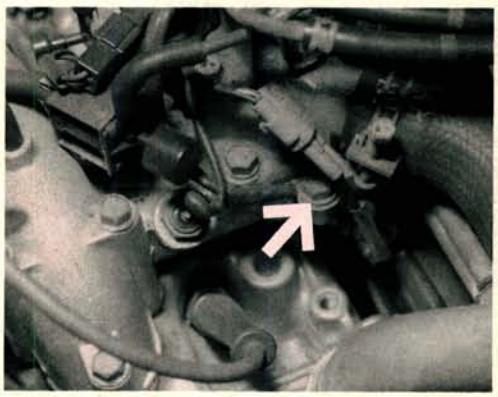
Rotate the crankshaft three times before adjusting belt tension (engine cold, tensioner bolts loosened). Line up the timing marks, then install a beam type torque wrench and cam sprocket adapter on the cam sprocket. Apply the recommended torque to remove belt slack. Tighten the tensioner bolts while maintaining the torque.



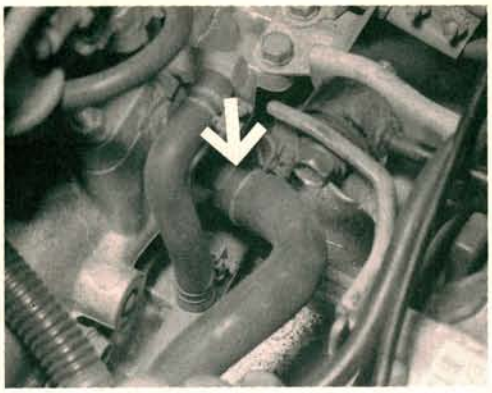
Check the base ignition timing at the transaxle window. The underhood sticker instructs you to plug the green test connectors together before checking the timing, but neglects to mention where the connectors are located. We found them under the fuel filter, above the brake booster on this 1989.



A larger diagnostic connector is located either under the hood near the green test connectors, or below the steering column near the control unit, depending on model year and fuel system. Four different self-diagnostic modes are available. Scan tools can also be used to retrieve serial data on injected models.



Loose or corroded ground connections may cause fuel injection problems. Engines with single point injection have an important ground next to the thermostat housing (arrow). Port fuel injection engines have a ground at the intake manifold. Additional fuel injection harness grounds are located on the core support.



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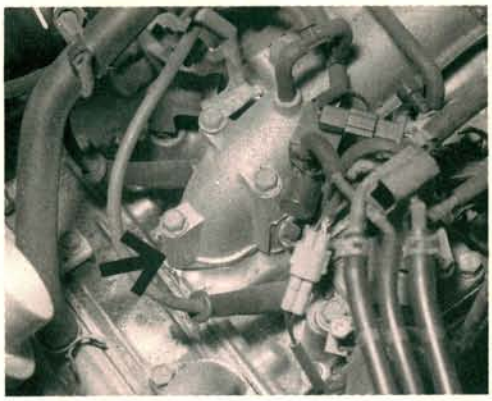
The PCV valve is hidden at the back of the intake manifold and is often overlooked as a maintenance item. A clogged PCV valve may force oil into the intake manifold and foul the air flow meter on 1985-86 port fuel injection systems. This prevents proper air flow meter operation, causing driveability problems.



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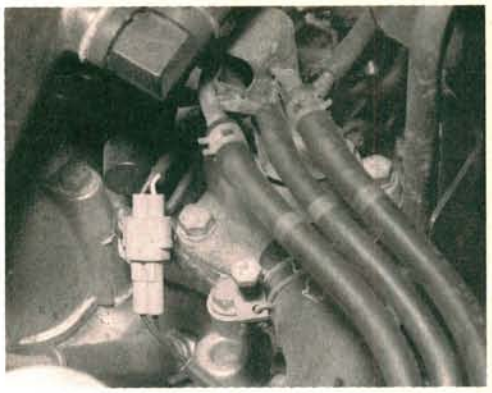
The aluminum engine parts expand and contract during heating and cooling cycles. Special gaskets are used between the intake manifold and the cylinder heads to handle these size changes. Do not apply sealer during manifold gasket replacement, as this will cause premature gasket failure.

21

Cooling system maintenance is especially important. Neglected antifreeze can cause internal engine corrosion, blockage, head gasket failure, and cylinder head cracking. Keep the outside of the radiator clean and replace the antifreeze at the recommended intervals (or sooner) to prolong engine life.



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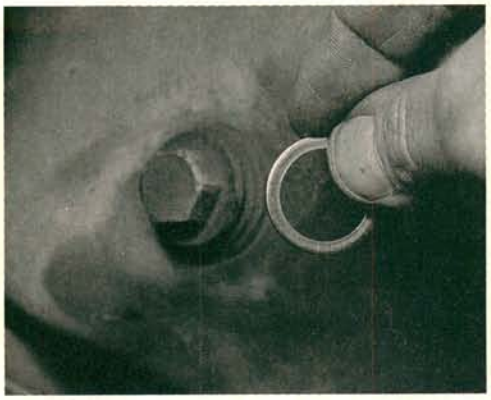
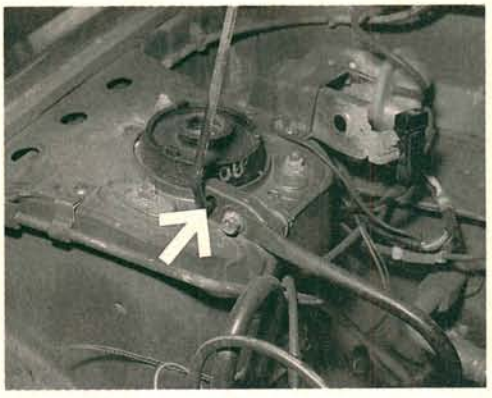
A three-stage thermostat is available to prevent engine hot spots during warm-up (P/N 21200AA120). The thermostat circulates a small amount of coolant through the radiator during warm-up so all engine parts reach operating temperature evenly. Turbo and non-turbo models will benefit from its use.



23

The oil pan drain plug washer should be replaced each time the drain plug is removed. A reused washer loses its ability to seal the threads. Overtightening the drain plug to keep it from leaking risks stripping the pan threads or rounding off the drain plug hex. A new washer is cheap insurance.



24

The two position hood is a handy feature. Move the hood prop from its core support location to the mounting eyelet located at the right strut tower. Install the other end of the prop in the secondary hood notch. This raises the hood to a nearly vertical position for easy accessibility.