



# Subaru Drivetrain

## ***Subaru Clutch Replacement***

Clutch disks, pressure plates and release bearings, just as brake linings, brake rotors and drums, are all wear items. Sooner or later they reach the end of their useful life and require replacement. We won't go into the symptoms of a worn-out clutch here. If you've been in the auto repair business for more than five minutes, you already know the symptoms. After all, technicians have been replacing worn-out clutch components for as long as there have been vehicles on the road.

Replacing a clutch, pressure plate and release bearing is a pretty straightforward affair on most vehicles, and Subaru vehicles are not exceptions. The Subaru all-wheel-drive system adds a few extra steps, but it's still a basic 'remove and replace' operation. If you can remember what you removed, and the sequence in which you removed it, your chances of success when replacing a Subaru clutch should be better than average.

This article details clutch replacement procedures on a 1995 AWD Subaru Legacy. While there are differences between this vehicle and other vehicles in the Subaru lineup, we feel there are also enough similarities to make it representative.

We won't detail every single step in the replacement procedure. We'll assume you are already familiar with the basics of a clutch R&R. If not, refer to a service manual for a step-by-step procedure. Instead, we will concentrate on the important steps that must be taken during this procedure to assure a successful and long-lasting repair.

## Transmission Removal Procedures



It may seem obvious, but the first step in the job is to disconnect the battery after recording the customer's radio station presets. Even a manual transmission has a surprising number of wires attached to and surrounding it. Why take the chance of damaging anything due to an accidental short circuit?

Remove the resin 'pitching stopper' and its bracket on the transmission. This step is necessary for the engine and transmission to drop far enough to clear the firewall during transmission removal. A special tool (P/N 927670000) is available to support the engine once the transmission has been removed, but you can replace the clutch without this aid.



links the clutch pedal to the Hill-Holder pressure hold valve (PHV). Loosen both cables and remove their bracket from the transmission.

Several electrical connectors are located at the top right side of the transmission (neutral position switch, back-up light switch, speed sensor, etc.). The connectors are color-coded, so it's a simple matter to disconnect them and move them aside. Also remove the upper transmission mounting bolts, assorted brackets, main battery ground cable and the starter motor at this time.



This transmission ground cable can easily escape notice. The other end of the cable is unreachable from above the transmission. A transmission case bolt must be removed to remove the ground wire at the transmission, so removing it at the body makes more sense to avoid the risk of a leak. Position the cable out of the way so it doesn't snag on anything during transmission removal.



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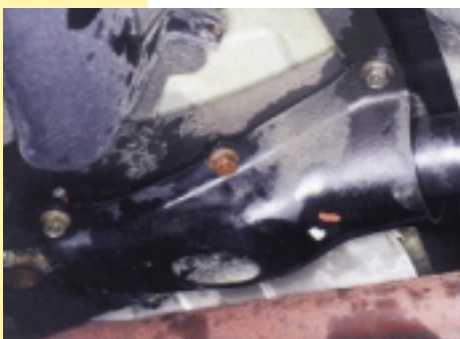
The front half of the exhaust system must be removed for clearance. Remove both spring-loaded bolts behind the catalytic converter. These special mounting nuts and bolts may be rusted together, so take your time or order a spare set of hardware for insurance before starting the job. Replace the exhaust gasket (donut) during reassembly, of course.

Six nuts secure the front exhaust pipes to the cylinder head exhaust outlets. Once again, use care and plenty of penetrating oil to avoid damaging the nuts, exhaust studs or worst of all head casting internal threads during removal. Replace the exhaust manifold gaskets during reassembly.



The entire front half of the exhaust system is now hanging from this mounting bracket and bolt. Remove the rear oxygen sensor electrical connector. Have an assistant remove the exhaust bracket bolt while you hold the exhaust system in position, then lower the exhaust assembly to the ground. The exhaust system isn't that heavy, but it's awkward to handle.

Remove this exhaust shield next to allow removal of the two-piece driveshaft. Depending on the age of the vehicle and the salt-dispensing policies of your local road crews, the small bolts securing the shield to the body may be rusted in place. Use patience and lots of penetrating oil, unless you want to spend some extra time with a drill later on.



Remove this reinforcing shield to allow removal of the two-piece driveshaft. The evidence of ample penetrating oil in this photo betrays our aversion to broken or damaged hardware. We'd rather be oily than drill out broken studs.



The rear driveshaft mounting flange mates to the differential flange in more than one position. Only one is right, though. Imbalance problems may be caused by changing the driveshaft to differential flange orientation during reassembly. To save yourself unnecessary grief, mark both flanges before removing the bolts. Match up your marks during reassembly.

Remove the driveshaft center bearing mounting bolts, then lower the driveshaft. Install a transmission extension housing seal plug or drain the transmission, unless you'd prefer a gear lube shower during transmission removal.



This photo reveals the Legacy's shift linkage, as well as the dummy yoke we installed at the tailshaft to keep the gear lube on the inside of the transmission. Disconnect the shift linkage, as well as torque reaction rod below it. Note the position of the shifter centering spring. You'll need to return it to this position during reinstallation of the shift linkage.

The front driveaxles are secured to the transmission stub axles with roll pins. Turn the driveaxle to inspect each end of the roll pin holes in the driveaxle. One end of the hole has a chamfered opening, while the other is flush-cut. The stub shaft's roll pin hole reflects the same pattern. When removing the roll pins, use a pin punch to drive the pins out of the axle, working from the flush-cut opening (shown).



When reinstalling the roll pins (always use new roll pins for reassembly), match up the splines to line up the chamfered hole in the driveaxle with the chamfered hole in the stub axle. The driveaxle hole may be marked with a dab of white paint, as seen here. Use a pin punch to drive the new roll pin into the hole through both the driveaxle and stub axle from this side, until it's evenly spaced in the driveaxle.

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**S**eparate the lower control arms from the steering knuckles at the lower ball joint pinch bolt (shown here). Use plenty of penetrating oil and take your time. A broken bolt here means you'll be spending extra time with a drill and your easy-outs, or replacing the steering knuckle.

**R**emove the front stabilizer bar bushing bolts. This will give the lower control arm the extra travel to temporarily push it down and out of the way of the steering knuckle.



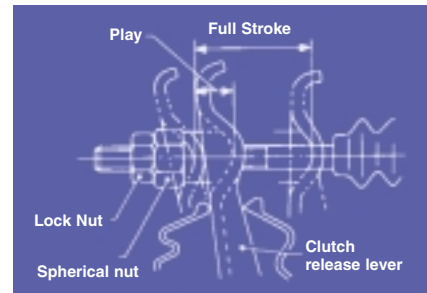
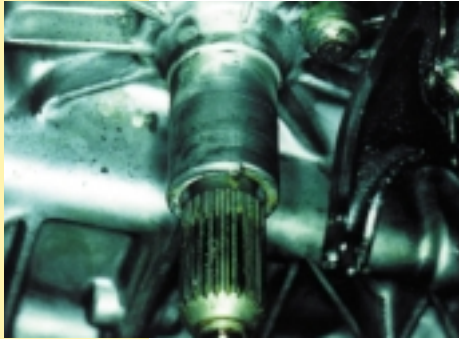
**S**eparate the lower ball joint from the steering knuckle, then push the steering knuckle/suspension strut assembly outward until the drive axle's inner CV joint splines are clear of the transmission stub axle. Use a block of wood or other method to hold the steering knuckle in this position until the transmission has been removed. During reassembly, to preserve bushing life and to return the vehicle as close as possible to its original wheel alignment, complete your final tightening of all suspension fasteners with the full weight of the vehicle on its wheels.



**R**emove the remaining transmission-to-engine bolts, then separate the transmission mounts from the body. Lower the transmission as far as possible to clear the body during removal. Transmission removal should go smoothly from here, but make sure the transmission input shaft is completely clear of the clutch disk before lowering the transmission. This alignment dowel was stuck in the transmission, and was transferred back to the engine bellhousing before reassembly.

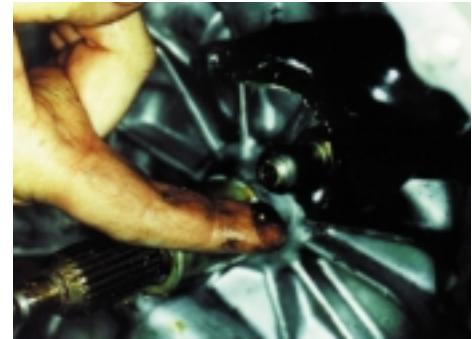
# Subaru Diatrain

## Clutch Service Tips



**R**emove the clutch release bearing and clutch fork, then check the condition of the clutch release bearing collar on the transmission. Any wear here will keep the release bearing from moving in and out smoothly, causing uneven clutch engagement/disengagement.

**C**lean the area thoroughly, then inspect all components for signs of wear and replace such parts as necessary. Apply a light coating of the approved lubricant to the clutch splines, release bearing collar and clutch fork pivot ball before reassembling these parts.



**T**his vehicle features a flush flywheel face, although some other Subaru models have stepped flywheel designs. Resurfacing of the flywheel face to remove warped areas or heat checking is not recommended. If damage is present, replace the flywheel.

**T**he owner of this vehicle complained of uneven, chattering clutch engagement. These heat check marks on the pressure plate may have been the cause. We also inspected the other side of the pressure plate for damaged or worn bearing contact areas at the center of the diaphragm spring and uneven finger height. All of these factors checked good on our pressure plate.



**A**lso visually inspect the pressure plate for the following items:

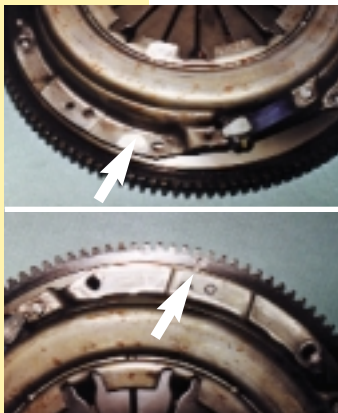
- loose thrust rivets,
- loose strap plate setting bolts.

# Subaru DiYtrain



**A**t 40,000 miles, this clutch disk still had plenty of meat left on it. The minimum allowable depth from the friction surface to the clutch rivets is 0.3 mm (0.012 inch). Also check for variations in friction material wear that would indicate a warped clutch disk. If there is evidence of oil on the clutch facings, inspect the transmission front seal, transmission case mating surface, engine rear oil seal and other points for leaks.

**I**f the flywheel has been removed, the flywheel bolts must be replaced. The mounting holes are offset, so the flywheel can only be installed in one position. Apply a dab of high-strength thread locker to each flywheel bolt, then lock the flywheel and torque the flywheel bolts in a star pattern to a final torque of  $72 \pm 3$  Nm ( $52.8 \pm 2.2$  ft-lbs.).



**T**he flywheel and pressure plate are marked with white paint dots (arrows) for balancing. Your natural inclination may lead you to line these dots up with one another during assembly. However, these paint dots must be positioned at least 120 degrees away from each other. Failure to observe this instruction may cause an imbalance condition and clutch engagement difficulties.

**M**ake sure the clutch disk is properly positioned (it's marked 'transmission side' on one side). Use a dummy shaft in the pilot bearing to center the clutch disk, then install the pressure plate. Torque the pressure plate bolts using a star pattern to a final torque of  $15.7 \pm 1.5$  Nm ( $11.6 \pm 1.1$  ft-lbs). The white flywheel and pressure plate dots are also visible in this photo. From here on out, it's a 'reassembly is a the reverse of disassembly' procedure, so we won't retrace our steps. Make sure all fasteners are tightened to specs along the way. If you don't end up with any 'extra parts' when you're done, you've done the job right.



**O**ne final note on the Hill-Holder system: Installing a new clutch changes the clutch cable adjustment and the Hill-Holder adjustment along with it. When the Hill-Holder cable is properly adjusted, the brakes should release at almost the same instant the clutch begins to grab. While there is a specification for freeplay on the Hill-Holder cable, your best bet may be to take the vehicle to a spot with a slight incline to fine-tune the adjustment. Ride the vehicle up the incline, then apply the brakes to set the Hill-Holder. Select first gear, then gradually engage the clutch. The vehicle should begin to move forward, without rolling backward first. Tighten or loosen the Hill-Holder cable to achieve this adjustment. This adjustment may have to be repeated after the initial period of wear.

