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Clutch Pedal Sticking

If you encounter a customer complaint of the clutch pedal not returning completely after being engaged, or if there is a spongy or light pedal feel while shifting, the following repair method should be followed. This condition may affect certain manual transmission vehicles with a hydraulic clutch system under certain weather conditions. The affected manual transmission Subaru models are as follows:

1995-2002 Legacy
1997-2003 2.5L Impreza
1998-2003 Forester

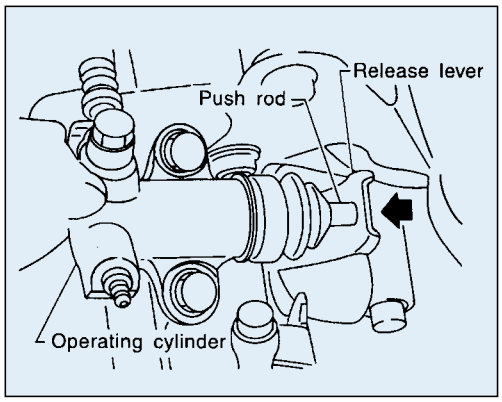
To correct this condition you must replace the parts in the chart that match your vehicle using the following procedures.

For naturally-aspirated models with hydraulic clutches:

• Remove the intake chamber from the backside of the intake manifold.
• Remove the clutch hose and the clutch operating cylinder. In this procedure it is not necessary to remove the master cylinder, the clutch pipe bracket.
• Replace the clutch hose and the clutch operating cylinder with new parts as listed below. Note that two pieces of gasket (P/N 114130151) used on the connector of the operating cylinder must be replaced with new ones when replacing the clutch hose. Tightening torque of the bolt is: 37 ±3 Nm (27 ±2 ft. lbs).
• Bolt the operating cylinder onto the transmission.
• Add brake fluid.
• Bleed the air from the system.
• Bleed the air from he system.
• Install the intake chamber.

For turbo models:

• Remove the intercooler.
• Remove the clutch operating cylinder hose. In this procedure, the clutch master cylinder, clutch pipe and bracket are unnecessary to be removed.
• Replace the clutch hose that was removed with the new one listed below. Note that two pieces of gasket (P/N 114130151) used on the connector of the operating cylinder must be replaced with new ones when replacing the clutch hose. Tightening torque of the bolt is: 37 ±3 Nm (27 ±2 ft. lbs).
• Add brake fluid.
• Bleed the air from the system.
• Install the intercooler.
• Insure there is no leakage from the line, check whether fluid leakage occurs after the clutch pedal has been fully depressed.
• Check whether the clutch performs normally.



Clutch Operating Cylinder

2002 WRX (5MT)

Clutch Operating Cylinder: Do not replace
Clutch Hose: 37251AA003
Gaskets for Hose: 114130151 X 2

Legacy (5MT)

Clutch Operating Cylinder: 30620AA042
Clutch Hose: 37251AC001
Gaskets for Hose: 114130151 X 2

Impreza (5MT)

Clutch Operating Cylinder: 30620AA042
Clutch Hose: 37251AC001
Gaskets for Hose: 114130151 X 2

Forester (5MT)

Clutch Operating Cylinder: 30620AA042
Clutch Hose: 37251AC001
Gaskets for Hose: 114130151 X 2

Power Steering Pump Replacement

When replacing the power steering pump on a Subaru vehicle, remember to replace the 0-ring between the pump and the reservoir. The pump does not come with the O-ring and if not installed, the pump will not operate. Also, make sure that the fluid level is at the proper level before you start the engine.

Front Suspension Noise 1995/96 Legacy

A squeaking noise in the front suspension during extremely cold weather (0°F or lower), may be caused by the front stabilizer bar bushings.

In extremely cold weather, the bushing material hardens and rubs against the stabilizer bar. You can often see the wear marks in the paint when removing the brackets that hold the bushings.

The noise can be eliminated, in most cases, by applying Dow Corning Silicone Grease #111 to the bushing and the stabilizer bar area where the bushings mount.

This grease has an operating range of -40°F to 400°F. It is also waterproof and will not wash away with water. If you cannot locate this grease, call Dow Chemical at 517.496.6000 and ask for a distributor in your area.

Cold Clutch Judder

If a customer complains of cold clutch judder that goes away after the first few applications, replacement of some clutch parts will be necessary to repair the vehicle. The following Subaru vehicles may be affected:

All 1999-2002 and some
2003 2.5L vehicles
All 2002 and some
2003 2.0L WRX vehicles

Prior to replacing these parts, confirm that the engine and transmission mounts are not broken, loose, or misaligned.

2.5L Parts

Use Clutch Kit: P/N 32098AA020. This kit contains the following parts (which can also be purchased separately):

Flywheel P/N 12342AA061
Cover P/N 30210AA590
Disc P/N 30100AA851
Bolts (8 pieces) P/N 800610740

Continued on page 20.

Note: If the OE flywheel and cover have more then 30,000 miles on them and are in good condition, they can be reused. After 30,000 miles of driving, the surface finish is equivalent to the replacement flywheel and cover.

2.0L Parts

Flywheel P/N 12342AA071
Cover P/N 30210AA570
Disc P/N 30100AA840
Bolts (8pieces) P/N 800610740

Note: 2002 WRX vehicles with an engine number of E/G #331738 and later can also reuse the OE flywheel and cover if they are in good condition and have more then 30,000 miles on them. Vehicles produced prior to E/G #331738 will need to install all four parts.

These countermeasure parts were installed into production beginning with the following VINs:

2.5L Legacy Baja	36103910
2.5L Legacy Sedan	36206712
2.5L Legacy Wagon	36305452
2.5L Legacy Outback	36622108
2.5L Impreza Sedan	3G506077
2.5L Impreza Wagon	3G805549
2.0L Impreza Sedan	3G500127
2.0L Impreza Wagon	3G800014
2.5L Forester	3G732771

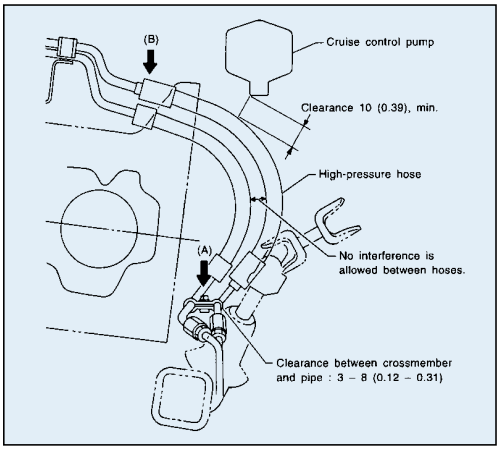
Vehicles after the listed countermeasure, or repairs to vehicles after the clutch set has been installed, can be repaired using individual parts as needed. Repair history should be checked to determine what parts are currently in the vehicle. The parts system should be checked for any future information regarding these parts.

Steering Knocking/Rattle Noise When Turning

If you should encounter a knocking or rattle noise from the vehicle steering system on a 1995-2000 Legacy, use the procedures below to diagnose and reduce or eliminate the noise. The noise is usually heard when turning and going over a bump in the road such as when turning into a driveway. Please keep in mind that while the noise sounds the same, the cause (and ultimately the repair performed) is different between 1995-99 Legacy and 2000 Legacy models.

The power steering assist is created using hydraulic pressure. This pressure is generated by the pump and then distributed through valving on the steering rack, to the appropriate side of the rack. There is always pressure on both sides of the rack, in order to provide quick steering reaction and a positive feel.

When the steering input is negative, that is, straight driving, the fluid is circulated for lubrication, while maintaining equal pressure. When the steering wheel is turned, hydraulic pressure is greater on the input side, while some residual pressure is maintained on the free side of the rack.



Power Steering Hoses

When turning the steering wheel, even slightly, on rough roads, or especially when entering a driveway over a curb, the tires will input a reactive force through the rack, caused by the impact. This causes the hydraulic pressure in the input lines to force back against the residual pressure in the free side lines. When the higher pressure hits the lower pressure, knocking noise is generated.

While some customers may object to this noise, it does not harm the steering system or any of its components. This noise can be reduced or eliminated by following the procedures below.

1995-1999 Model Years

If you should encounter the condition on a 1995-99 Subaru vehicle, it will be necessary to install a steering universal joint with damper. The steering universal joint with damper are available in two lengths.

Legacy Models: P/N 34160AC030 (shorter length)

Outback Models: P/N 34160AC090 (longer length)

Always check the part number suppression for any changes. After installing the new steering universal joint with damper using the procedures in the appropriate service manual, it will be necessary to drive the vehicle to confirm the correction.

2000 Model Year

If you should encounter the condition on a 2000 Subaru vehicle, it will be necessary to install a set of modified power steering lines.

Modified Power Steering Lines: P/N 34190AE120

Always check the part number suppression for any changes. After installing the Modified Power Steering Lines using the procedures in the appropriate service manual, drive the vehicle to confirm the correction.

Outback Gear Ratios

When performing repairs on automatic or manual transmission Outback vehicles, be certain to check appropriate Service materials to determine whether or not the vehicle you are working on has a different final drive ratio than a non-Outback version of the same vehicle. If a different ratio is indicated, be certain to obtain the correct matching parts while performing your repairs.

Noise From Rear Axle Oil Seal — Legacy Models

If you encounter a high pitched noise coming from the rear of Legacy vehicles, the cause may be

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rear axle oil seal number 2 coming loose from its mounting. This noise can often be duplicated by placing the vehicle on a lift and rotating the tire on the side suspected of causing the noise.

Too much pressure applied during the seal installation process may be responsible for the seals becoming loose.

A modified installation procedure has been instituted and applies to the following VIN range:

Sedan: V7209190
Wagon: V7312934
Outback: V7624830

If you encounter this noise, inspect the above mentioned seal for proper installation. If you need to install a new seal, do not apply too much pressure when installing it. Otherwise, the seal may be deformed and work loose at a future date.

4EAT Speed Sensors

If you are in the process of diagnosing delayed or erratic shifting on a 4EAT transmission, pay close attention to the comparison of readings between speed sensor 1 and speed sensor 2 as displayed on the Select Monitor. If these sensors are working properly, the two readings should be close, but are rarely absolutely identical. If, however, in the vehicle that you are driving, you notice that the speed sensor 1 signal and the speed sensor 2 signal are always precisely identical, there may be a malfunction in the signal or circuit from one of the sensors. When the transmission computer senses a failure in one of the speed sensor circuits, it may substitute the other sensor's reading in the display of the Select Monitor. This is why the two readings would be identical. Check the computer's memory for fail codes corresponding to either or both of the sensors.

If you have codes for both, identify which sensor is the one that is not sending a proper signal by looking at the speed sensor display in the engine computer side of the Select Monitor. The engine computer only monitors speed sensor 2. If the engine computer reports a good speed sensor 2 reading, then you're likely to have a concern with the signal from speed sensor 1 to the transmission control computer. Speed sensor 1 is the speed sensor in the back of the transmission by the transfer clutch on an AWD vehicle and inside the transmission back cover of a two-wheel drive vehicle. Diagnose with resistance readings, direct signal monitoring, and physical examination, if required.

If speed sensor 1 checks out, and it has been determined that speed sensor 2 itself is okay (since the engine control computer can read it), check the connections from speed sensor 2 to the transmission computer.

Identifying 1997 Subaru Legacy Propeller Shafts

There is a paint mark located on the end of the universal joint that fastens to the rear differential. It is necessary to unbolt the propeller shaft from the rear differential to locate the paint mark.

Sedan & Wagon 5MT
Paint Color: Blue
P/N 27031AC080
Outback 5MT
Paint Color: White
P/N 27031AC060
Outback 4EAT
Paint Color: Pink
P/N 27031AC070
Sedan & Wagon 4EAT
No Paint
P/N 27031AC010

Driveshaft Removal

Rear Axle Binding On Turns

If a customer complains of a rear axle that is binding on turns, physically measure the outer circumference of the tires before making any repairs. This means that you must actually measure the tires using a piece of string or a flexible measuring device. Differences as small as a 1/4-inch can cause a binding situation.

It doesn't matter what the numbers are on the sidewall of the tire. Even new tires can be different sizes due to variations in the molds they come from. Different tire brands can be and, in most cases, are different sizes even though they may have the same numbers on the tire sidewall. This is why you must measure the tires.

Tires can only be considered the same" if they are all the same size, the same manufacturer, and the measurements mentioned above are within the 1/4-inch limit.

If the vehicle has lots of miles on it, determine whether the tires have been rotated on a regular basis. Most have not and this causes them to wear differently.

It's a whole lot easier to take the time to measure the tires than it is to rebuild an AWD clutch pack along with its assorted subsystems, then find out that the tires were causing the problem all along.

Grease Leaking From Inner Axle Joints

If you encounter a 1998 Subaru that has grease leaking out of the inner axle joint along the transmission splined stub shaft, the situation can be repaired by doing the following:

- Remove and disassemble both inner axle joints.
- Clean the grease from the joints.
- Inspect the "freeze out" plug that covers the splined shaft area in the base of the inner joints to be sure that the plug has not fallen out.
- If the plug has fallen out, it may be possible to reinstall it. Make certain you do not block the air bleed hole. This air bleed hole is located at a point around the outer circumference of the seal plug. If the air bleed hole is blocked, then there is a possibility that the axle boots may be damaged.
- Install new grease P/N 28093TA000. (This grease is used on 1997 model year vehicles).
- Reassemble.

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Rear Differential Vent Oil Leakage

If you should encounter a rear differential leaking oil from the vent, please perform the following procedures:

- Check to see if the rear differential has been over-filled with oil. If not, proceed to the next step.
- Drain the rear differential.
- Remove the rear differential from the vehicle.
- Remove the vent from the rear cover.
- Turn the differential over and drain the vent chamber.
- Reinstall the vent and rear differential assembly back into the vehicle.
- Fill the rear differential with new fluid to the proper level.
- Road test the vehicle and reinspect for leaks.

Note: If leakage is going to occur, it will usually happen on low mileage vehicles. If mileage is high, then check for other causes like improper gear ratio, improper tire match, wrong type of fluid, etc.

1999 4EAT Transmission Operation

There are seven different shift schedules/maps in the TCM logic control of the 1999 Second Generation 4EAT. They are Normal, Power, Slope, Hold 2nd, Cruise, Hot ATF, Cold ATF. The shift schedule/map will determine how and when the transmission shifts. For example, in the slope mode, when driving up a hill under certain engine load conditions, the TCM will shift the transmission back down to 3rd gear.

In most cases, the transmission will stay in 3rd gear until the vehicle reaches the top of the hill, then it will upshift.

Phase II 4EAT Transmission

This is done to keep the transmission from upshifting/downshifting in and out of 4th gear needlessly. On the uphill control, the slope angle is estimated from the throttle opening angle and vehicle speed change. When the TCU detects that the vehicle is moving uphill, upshifting is restrained by selecting a special shift map, which prevent needless upshifting/downshifting.

When driving downhill, under coasting conditions, if the driver touches the brake pedal, the TCM will downshift the transmission into 3rd gear to provide engine braking. This downhill control is canceled when the TCU detects the vehicle acceleration by the driver's depressing of the accelerator pedal and input from the Throttle Position Sensor.

Both of these conditions are part of the slope control logic and are a characteristic of the vehicle TCM logic.

If a customer comes to you with a transmission shift concern, question the customer thoroughly on how and when this condition occurs. If possible, road test the vehicle with the customer. If it is something you're not sure about, drive a similar vehicle to determine if there is a problem with the customer's vehicle.

Noise From Rear Axle Oil Seal — Legacy Models

If you encounter a high pitched noise coming from the rear of Legacy vehicles, the cause may be rear axle oil seal number 2 coming loose from its mounting. This noise can often be duplicated by placing the vehicle on a lift and rotating the tire on the side suspected of causing the noise.

It has been determined that too much pressure during the seal installation process might be responsible for the seals becoming loose.

A modified installation procedure applies to the following VIN range:

Sedan:	V7209190
Wagon:	V7312934
Outback:	V7624830

If you encounter this noise, inspect the above-mentioned seal for proper

installation. If you need to install a new seal, be certain you do not apply too much pressure when installing it. Otherwise, the seal may be deformed and work loose in the future.

Rear Differential Modifications

Rear differentials with an updated style pilot bearing and AKA pinion bearing are available. This is a countermeasure for a high pitched whine noise (sometimes described as a turbine jet engine winding up) from the rear differential that can start at a relatively slow speed (25 mph) and rises in pitch and volume to about 50 mph. This can be distinguished from the characteristic differential ring and pinion noise by the fact that pilot bearing noise will be unaffected by installing the front wheel drive fuse, whereas the ring and pinion noise will effectively disappear with the fuse installed. The slight ring and pinion noise occurs in the 40-60 mph range and is considered a normal characteristic of the rear differential. However, the pilot bearing noise can be corrected.

Order the updated assembly by looking up the appropriate part number and changing the last digit to a 2. If you have a question regarding the part number or its availability, please consult your Subaru parts department.

Please note that these modifications and part number changes only pertain to Nissan-produced differentials. These can be identified by part numbers starting with 27011AA***. Physically, the differentials can be identified by the fact that the side covers for setting case preload are bolted on as opposed to the Fuji-produced differential (38300AA***), which have side covers that screw in similar to the side covers on Subaru front differentials.

Shifter Rattle

If you encounter a shifter rattle complaint on a 1996/97 Legacy Outback or on a 1998 Forester, the necessary parts are available to correct this symptom. For the 1996 Legacy Outback, order a modified spacer, P/N 35045AC040. For the 1998 Forester or 1997 Legacy, order a modified bolt, P/N 35045FC000.

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Manual Transmission Case Boss Wear

Some shops are replacing the transmission case because of wear found on the case boss. This has been a judgment call because the Service Manual does not provide specifications. Fuji Heavy Industries has provided information regarding the wear limit of this case area. It is not necessary for the case to be replaced if this area is not worn under 32.8 mm. Always measure this boss prior to ordering a new case.

Correct Axle Ratios

You've just changed a 4EAT/AWD transmission or rear differential and now the rear axle is binding during the road test.

Or, the customer has brought the vehicle in complaining about a shudder when turning (rear axle binding). They inform you that the problem has occurred since the transmission or rear differential was changed at another shop.

The possible cause may be an improper front to rear axle ratio match. Driving a vehicle with different front to rear gear ratios, even for a short time, may cause permanent damage to the transfer clutches.

To determine if the front and rear axle ratios are the same or different without removing the transmission, use the following procedure:

1. Position vehicle on the ground.
2. Lift one side of the vehicle so that the tires are off the ground. Block the wheels on the other side of the vehicle as a safety precaution. If lifting the vehicle with a floor jack, place jack stands under the vehicle.
3. With a marking crayon, place a mark on the two raised tires at the 6 o'clock position.
4. Open the hood and disconnect the main wiring harness for the transmission or unplug the TCU. This will put the transmission in its Fail-Safe mode.
5. Place the transmission gear selector in Neutral.
6. Start the engine.
7. Manually rotate one of the raised tires through at least five rotations.
8. If both axle ratios are the same, the marks on the tire should be in the same positions as each other. If not, the axle ratios are different.

Note: This procedure must not be attepted on 1991 Legacy Turbo or SVX vehicles. These vehicles are equipped with a limited slip rear axle.

Caution should be used whenever you are working on manual or automatic transmission vehicles. Leave the parking brake off, but make sure the wheels that are on the ground are blocked. On automatic transmission vehicles, be sure that the shift lever is not placed into any Drive ranges. If you suspect that the differential may be locked due to internal damage, do not perform this test. Make sure nobody is around the vehicle while conducting this test, other than the person performing it. Never leave the vehicle running and unattended.

Popping Out Of Fifth Gear

Some 1999 and 2000 Legacy and Forester vehicles may intermittently pop out of fifth gear when coasting. The cause may be a loose main shaft nut. In some cases, all that maybe necessary to repair the transmission is to replace the nut, torque to specifications and stake the nut. In other cases, damage to the hub and syncro assembly may be found.

4EAT Remanufactured Transaxles

Subaru of America, Inc. offers remanufactured automatic transmissions for most Subaru models, starting from 1990 vehicles. Please check applications and availability through normal parts channels prior to making vehicle repairs.

Never attempt to repair a remanufactured transmission. These units are warranted by the remanufacturer for 2 years or 24,000 miles. If you attempt to repair the unit, it will void the warranty. This will result in the remanufacturer rejecting your claim.
Remanufactured units can be identified easily because they are painted gray.