

STANDARD CLUTCH SYSTEMS INSTALLATION INSTRUCTIONS



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System Inspection

Examination of the removed clutch system components in many cases can reveal the reason for the failure of the removed unit. If the removed clutch components failed due to reasons other than normal wear or driver abuse, a close inspection can identify the reason for failure, and prevent premature failure of the replacement unit.

If oil is present on the facing of the clutch disc, check the rear main seal for leakage. If the oil appears to be grease then examine the release bearing. It is possible the bearing was continually rotating because of improper adjustment, or the driver was riding the clutch pedal. There are some bearings that are designed to continually rotate, but for those applications that are not designed to endure this, the bearing will become hot. The grease will liquefy and saturate the facing. Also examine the quill of the transmission. There may have been excessive grease placed on the quill, which contaminated the facing.

Examine the input shaft of the transmission. Clean the shaft with a wire brush and inspect. If there is excessive wear, replace the input shaft. For reinstallation, place a light film of white lithium grease on the input shaft. Do not over lubricate. Excessive grease will contaminate the disc facing.

Look for evidence of engine and transmission misalignment. Misalignment can cause non-release of the clutch system. There are certain conditions to look for that are caused by misalignment. The pilot bearing/bushing will have more wear on one side than the other. Uneven wear or tapered splines on the input shaft or disc splines indicate misalignment. Broken cushion segments on the clutch disc are also indications of misalignment. Broken mounts, warped bellhousing, damaged vehicle frame, or a flywheel that is wobbling on the crankshaft flange mount can cause alignment problems.

Tools Required

The replacement of the clutch system requires basic hand tools for most of the operation. There are, however, a few specialty tools that simplify the removal and installation of certain components of the clutch system. Alignment tools work very well in aligning the clutch disc and pilot bearing. This provides for the easy installation of the transmission. AltoStandard Clutch Kits include a plastic alignment tool for your convenience.

A pilot bearing puller makes the removal of the pilot bearing/bushing very easy. If you do not have one of these, they can be rented at several equipment rental centers. For your own safety, if you do not have access to a vehicle hydraulic lift we strongly recommend you support the vehicle with jack stands. Never work under any vehicle supported by only a jack.

Pre-inspection

Before beginning the clutch system replacement, there are a series of inspections you should perform prior to the clutch removal. Most clutch failures occur on a vehicle after 60,000 miles. The need for a clutch replacement prior to that is unusual and should be investigated.

If the clutch system is slipping, a simple adjustment could correct the problem. As the friction material wears, the fingers (diaphragm) of the cover assembly move closer to the bearing. To maintain the correct bearing lash, the bearing needs to be adjusted backwards away from the cover assembly. If the release system is hydraulic, it is possible that the clutch master cylinder needs to be replaced. Master cylinders have a valve that allows the return of fluid back into the reservoir to allow the bearing to move back away from the cover assembly. You can check this if the system has an external slave cylinder. Detach the slave cylinder from the bellhousing. Remove the top of the master cylinder. Have someone look at the reservoir as you push the piston of the slave cylinder back into the slave cylinder. If the fluid does not return back into the reservoir, the master cylinder needs to be replaced.

If the clutch system is not releasing, the following inspections should be made. If the release system is hydraulic, inspect the master cylinder reservoir fluid level. If it is dry, inspect the master cylinder and the slave cylinder for fluid leaks. If no leaks are found then refill reservoir and examine again after driving the vehicle a short distance. You should also inspect the transmission mounts and motor mounts to be sure they have not broken. Broken mounts can misalign the engine and transmission and prevent the release of the clutch disc. Replace these if necessary. Also, if the vehicle has recently been involved in a collision and clutch release problems occurred after that event, it is possible that the frame is damaged and is causing a misalignment of the engine and transmission. If a clutch release cable operates the system, attempt to adjust the cable so that the bearing is moved closer to the cover assembly. If there is no additional adjustment on the cable, it is possible that the cable has stretched. Replace the cable and test before removing the clutch. It is recommended to replace the cable with every clutch system replacement.

If the clutch system has a bearing noise, a simple test can identify which bearing is creating the problem. Sit in the vehicle and start the engine. With the engine running and the transmission in neutral and both feet on the floorboard, listen for the bearing noise. If the noise is heard at this point, the bearing creating the noise is in the transmission because the clutch release bearing and pilot bearing are not moving at this time. Next place your foot on the clutch pedal and begin to depress the pedal half way down. If the bearing noise is heard at this point, the bearing making the noise is the clutch release bearing. The pilot bearing is not moving at this point. If after depressing the clutch pedal all the way to the floorboard the bearing noise is heard, the bearing creating the problem is the pilot bearing or bushing. By doing this simple test you can identify the problem before removing the clutch system.

Transmission Removal

Removal of the transmission is very easy if you use a transmission jack to support the transmission after removing the bolts securing it to the bellhousing. If a transmission jack is not available, one technique that works well is to remove the top bolts of the transmission that secures it to the bellhousing. Install long guide pins in the same holes that you have removed the transmission top bolts from. The transmission will slide back easily on these guide pins until the input shaft clears the clutch assembly and then the transmission can be lowered to the floor. It is recommended that you have someone assist you in lowering the transmission down. Transmissions vary in weight, but depending on the transmission, can range from one hundred to

several hundred pounds. Once the transmission is removed examine the quill of the front bearing retainer sleeve of the transmission. The quill is prone to wearing due to the clutch release bearing sliding back and forth on it. If there is wear here, it is critical that this be replaced. Failure to do so will cause the clutch release bearing to bind on the quill, and prevent the release of the clutch system. On certain Ford vehicles this quill is part of the complete transmission case and cannot be replaced. There is a kit offered by AltoStandard to repair this quill by placing a sleeve over this area. For a fraction of the cost of replacing the transmission case, AltoStandard offers a kit that will help repair the quill by placing a sleeve over the area. The kit includes a clutch release bearing which has a larger internal dimension to slide over the sleeve.

Bellhousing Removal

After removing the transmission, remove the starter if necessary. Disconnect the clutch fork and spring. Remove the bellhousing bolts and lower to the floor. Remove the clutch release bearing from the fork. Remove the clutch fork from the ball stud and clean. Inspect the fork and ball stud for wear. If there is wear on these components, they should be replaced. Remove the bolts from the clutch cover. As the cover is removed, carefully grab the clutch disc as it falls out. At this point, pay close attention to which side the clutch disc spring dampener is facing so you are aware of how it should be reinstalled. Using the pilot bearing removal tool, remove the pilot bearing from the end of the crankshaft.

Flywheel Removal

Before removing the flywheel, using a punch, make corresponding marks on the flywheel and the crankshaft. This technique assures that the flywheel can be reinstalled at the same location as it originally was. This eliminates the possibility of corrupting the balance of the engine. Secure the engine from rotating and remove the flywheel bolts. The flywheel bolts will be very tight due to tightening compounds used on installation.

Reinstallation of New Clutch Kit

Once you are ready to reinstall the new clutch kit, the important issue becomes cleanliness. Greasy hands can easily contaminate a clutch disc. Grease on the disc will cause clutch chatter. If this should happen the best cleaner to use is acetone. It does not leave a residue on the product.

Install pilot bearing/bushing. It is best not to lubricate the pilot bearing or bushing. Both types of pilots are pre-lubricated. If the pilot bushing is lubricated with grease it will fuse itself on the end of the input shaft and at that point the clutch system is inoperable. It should be pointed out that the only time the input shaft of the transmission is rotating in the pilot is when the clutch pedal is depressed all the way. When installing the pilot in the end of the crankshaft, place a flat non-metallic material between the pilot and the installation tool. As you tap the pilot into the end of the crank be sure that it is going evenly. The pilot bearing/bushing must be flush with the end of the crankshaft.

Installing a resurfaced flywheel. Inspect both the flange on the crankshaft and the mounting surface of the flywheel. Make sure there are no burrs that might prevent the flywheel and the

crankshaft flange from mating evenly. On older vehicles, which have had the clutch system replaced more than once, it is possible that the flywheel may be too thin. The problem with this condition is the possibility of the flywheel bolts coming in contact with the clutch disc hub. To check this, hold the flywheel flat and drop the flywheel mounting bolts through the holes of the flywheel. Lay a straight edge across the flywheel surface over the bolts. If the straight edge does not touch the bolt heads, there will be no interference. When installing the flywheel, Do not use air impact tools. Place some thread lock adhesive on the bolts and start them by hand. Tighten the flywheel bolts in a star pattern using three passes. Once the bolts are tight, torque them to the vehicle manufacturer's specifications. Be sure to wipe off the contact surface of the flywheel with acetone to remove any grease or coating.

Install the clutch disc and cover. Before placing disc on the flywheel, place the disc on the input shaft of the transmission and slide back and forth to ensure fit. Put a thin coating of white lithium grease on the splines. Place the disc against the flywheel with the flywheel side of the disc against the flywheel. Place the disc alignment tool through the disc splines, and press it firmly into the pilot bearing/bushing. This should hold the disc while you place the cover assembly over the disc. Before placing the cover against the disc, wipe the pressure plate surface with acetone to remove any grease or coating that may be present. Place the cover against the clutch disc, and insert the bolts by hand. Insert all of the bolts and then begin to tighten in a star pattern by hand. Do not use air impact tools. Once the bolts are tight, torque them to the vehicle manufacturer's specification. Remove the alignment tool.

Install the clutch release bearing. Inspect the new clutch release bearing and be sure there is grease inside the I.D. of the bearing. Most of the bearing manufacturers pre-lubricate their bearings, but there are a few exceptions. This grease allows the bearing to slide easily on the transmission quill. Attach the clutch release bearing to the clutch fork. Apply a thin layer of white lithium grease on the ball stud. Install the fork assembly on the ball stub in the bellhousing. Inspect the clutch fork mechanism for smooth operation. Before reinstalling the bell housing, inspect the mounting surface of the bellhousing. Make sure it is clean and smooth. If there are any burrs use a wire brush to remove. The bellhousing must be perfectly flat against the engine, or a possible misalignment of engine and transmission will occur. Install the bellhousing by placing all of the mounting bolts in by hand and tighten using a star pattern with three passes. Do not use air impact tools.

Install the transmission. A transmission jack is recommended to hoist the transmission in position. The transmission needs to be supported completely to avoid hanging the transmission on the clutch disc. In many cases the clutch job is ruined at this point. The transmission is allowed to hang on the clutch disc before the input shaft is in place in the pilot bearing, the result is, the clutch hub becomes bent and will now wobble on the input shaft. This will prevent a release. If a transmission jack is not available, install long guide pins in the top mounting boltholes of the bellhousing. Place the transmission on the guide pins and slide forward. These will support the transmission while you install the lower mounting bolts into the bellhousing. As you slide the transmission forward, do so slowly. Be sure the input shaft of the transmission slides easily through the I.D. of the clutch release bearing and that you do not knock the fork off of the ball stud. Install the mounting bolts of the transmission and tighten using the star pattern with three passes.