

CLUTCH-01, Clutch Replacement

Introduction

Replacing the clutch on a 944 can be one of the most intimidating jobs a home mechanic can undertake. Although there is nothing about a clutch replacement that is beyond the capability of most home mechanics, the job is very time consuming and requires a great deal of patience. If you take the car to a professional shop for a clutch replacement, the average labor times for the replacement are as follows:

944 Clutch Labor Times	
Vehicle	Time (hrs)
944	16
944 Turbo ¹	20
944 Turbo ²	24

¹ Two piece crossover pipe

² One piece crossover pipe

Tools

- Metric Socket Set
- Metric Wrench Set
- Jack stands
- Floor jack
- Clutch alignment tool (944 specific or Metric Universal)
- 8 mm Cheesehead tool (12 point internal)
- 12 mm Cheesehead tool (12 point internal) if flywheel is to be replaced or removed for resurfacing
- Slide hammer bearing puller set
- Various screwdrivers (Phillips and Straight Tip)
- 150 mm long, 8 mm thread bolt
- Pliers (preferably locking)
- Hammer
- Molybdenum Disulfide Grease (MoS₂)

Other Procedures Needed

- [EXH-01](#), Exhaust Manifold Removal and Installation
- [TRANS-03](#), Transaxle Removal and Installation
- [IGN-02](#), Speed and Reference Sensor Replacement
- [BOLT-01](#), Allen Head and Cheesehead Bolt Removal

Removal

1. Place car on jack stands.
2. Remove belly pan.
3. Remove the exhaust system from the exhaust headers back. On 944 Turbos this means removing the crossover pipe. For early 944 Turbos with a one-piece crossover, the intake manifold must be removed. Refer to [EXH-01](#) for removing applicable portions of the exhaust system.
4. Remove all of the exhaust system hangers from the torque tube.
5. Disconnect the battery positive lead.
6. On top of the clutch housing, cover the timing mark window with a piece of duct tape. This will keep you from inadvertently dropping anything into the clutch housing.
7. Remove the speed and reference sensors (on top of the clutch housing).
8. Disconnect the cable clamp next to the speed and reference sensors (alternator to starter).
9. Disconnect the ground wires (2) on top of the clutch housing (near the speed and reference sensors).
10. Remove the heat shield from the starter (if equipped) and disconnect the starter electrical leads.
11. Some early vehicles will be equipped with a support between the engine and clutch housing (near the bottom of the exhaust headers). If equipped, remove the support.
12. Remove the starter retaining bolts (2) and remove the starter from the car.
13. Disconnect the cable clamp on the side of the clutch housing (above the starter).
14. For turbocharged cars, loosen the clamp on the wastegate diaphragm hose and remove the hose.
15. For turbocharged cars, remove the retaining bolts that hold the wastegate bracket to the torque tube and remove the wastegate from the car.
16. Remove the transaxle using [TRANS-03](#).
17. Remove the fuel filter.
18. Remove the transaxle carrier.
19. Disconnect the clutch slave cylinder from the clutch housing and hang out of the way.
20. Support the engine underneath the oil pan with a jack and a block of wood. The block of wood protects the oil pan from damage.
21. Remove the 4 bolts that attach the torque tube to the clutch housing.
22. Remove the shift lever and shift lever base plate from the torque tube.
23. Slide the torque tube towards the rear of the car. It will be necessary to rotate the torque tube 180° to allow the triangular tabs on the torque tube to clear the torsion bar tube.
24. Remove the clutch release lever retaining bolt from the clutch housing (just above the opening in the clutch housing for the starter).
25. Thread the long 8 mm thread bolt into the end of the release lever pivot shaft. Remove the release lever pivot shaft by holding the 8 mm bolt with a pair of pliers and tapping the pliers with a hammer or prying with a screwdriver.

26. Remove the 4 clutch housing retaining bolts (2 at the top of the housing - 2 at the bottom)
27. Remove the clutch housing and release lever.
28. Using the 8 mm cheesehead tool, remove the pressure plate retaining bolts. Wake up the bolts using [BOLT-01](#), make sure the tool is completely seated in the bolt head, and remains seated in the bolt head at a 90° angle while loosening the bolts. The engine will likely try to turn when you attempt to remove the flywheel bolts. Here's several ways to keep it from turning while removing the bolts:
 - a. Use an impact wrench. Personally, I don't like this method. It's too easy to strip the bolts IMHO.
 - b. Install two pressure plate bolts into the flywheel and hold a screwdriver between the two bolts to apply counter-torque while you loosen the flywheel bolts.
 - c. Have someone hold the crankshaft pulley bolt (15/16") with a socket and ratchet.
 - d. Use the Porsche "engine-out" flywheel lock to hold the flywheel in position while loosening the bolts.
 - e. Clamp the edge of the flywheel using a pair of Vise Grip pliers.
29. Remove the pressure plate, release bearing, and clutch plate.

NOTE

- If the bolt head strips, drill the bolt head off. Personally, I recommend replacing the retaining bolts with new hardware. Also, if the flywheel is to be resurfaced, you should replace the flywheel bolts as well.
30. If the flywheel is to be resurfaced, remove the flywheel retaining bolts using the 12 mm cheesehead tool.

NOTE

This is an excellent opportunity to replace the rear main oil seal.

31. The next step is to remove the pilot bearing in the end of the crankshaft. Some people elect not to replace the pilot bearing because it can sometimes be difficult to remove. However, they usually end up regretting it later. In my opinion, replacing the pilot bearing is essential. There are three methods of removing the pilot bearing:
 - a. There are several different types of bearing pullers which will work on the pilot bearing. Baum Tool and Automotion (among others) offer a bearing puller specifically for pilot bearings. You can also use a slide hammer puller with a pilot bearing attachment.
 - b. The second method involves inserting a bolt into the bearing opening with a head slightly smaller than the opening. Catch the edge of the bolt head behind the bearing, grasp the other end of the bolt with pliers, and tap on the pliers with a hammer.
 - c. I've had success using this method on other vehicles but, limited success on 944s. Pack the area behind the bearing with grease until it is completely full. Using a wooden dowel slightly smaller than the bearing opening, place the dowel in the hole and hit the end of the dowel sharply with a hammer. If the area is packed solidly with grease, it will force the bearing out.

Installation

1. If the pressure plate is to be replaced (recommended), remove the toothed starter ring from the pressure plate. The ring fits tightly on the pressure plate, so a large diameter wood dowel or brass punch and hammer will be needed to tap around the outside edge of the ring to free it. Install the starter ring on the new pressure plate. Ensure the holes in the starter ring line up with the bolt holes in the pressure plate while installing.
2. Install a new release bearing on the pressure plate. You may need the snap ring from the old release bearing if the new bearing does not come with one. Install spacer(s) onto the release bearing. Insert the bearing into the opening on the pressure plate. While holding the bearing in place, lay the pressure plate on a flat surface with the pressure plate friction surface facing up. Press down on the sides of the pressure plate to compress the pressure plate fingers. This will allow enough clearance to install the snap ring onto the release bearing. The number of spacers installed should not prevent the snap ring from being installed. Also, once the bearing is installed and the snap ring is in place, there should be a small amount of movement between the release bearing and the pressure plate.
3. Install the new pilot bearing. Apply a thin coating of MoS₂ grease to the inside surface of the bearing (where the end of the drive shaft will insert). Use a socket of the same size of the outer diameter of the bearing and tap into place using a socket extension and hammer.

4. Install new needle bearings (2) in the clutch release lever. Apply a small amount of MoS₂ grease to the release lever bearings and to the rubbing surfaces of the release lever arms (i.e. at release bearing surfaces and socket for slave cylinder piston). The shop manual calls for a coating of white solid lubricating paste (AOS 126 0006). However, it's my understanding that this paste tends to harden in the bearings and is no longer used. So, use the MoS₂ grease instead.
5. Install the flywheel if removed. Torque the flywheel to crankshaft bolts to 90 Nm (65 ft-lb)
6. Replace guide sleeve in the clutch housing if needed or desired. If the guide sleeve is replaced, torque the bolts to 15 Nm (11 ft-lbs). Coat the inside of the guide sleeve (even if you don't replace it) with a light coating of MoS₂ grease.
7. Apply a small amount of MoS₂ grease to the splines on the inside of the new clutch disc and the splines on the end of the driveshaft.
8. Before installing the clutch components, clean the friction surfaces of the flywheel and pressure plate. Brake cleaner works well in this application. Ensure your hands are clean when handling the pressure plate and clutch disc.
9. Ensure the pin on the flywheel is pointing straight down.
10. Using the clutch alignment tool align the clutch disc to the flywheel. Ensure the tool is inserted fully into the pilot bearing.
11. Install the pressure plate with all bolts partially threaded before final torquing. Tighten the pressure plate bolts a few turns at a time, alternating sides as you tighten the bolts around the circumference of the pressure plate. This ensures the pressure plate is pulled down evenly onto the surface of the flywheel. Torque the pressure plate bolts to 25 Nm (18 ft-lb).
12. Remove clutch alignment tool.
13. Apply a thin coat of MoS₂ grease to the inside surface of the guide sleeve on the inside of the clutch housing.
14. Locate the release lever in the clutch housing and install the housing with the clutch lever onto the block. The block has alignment pins to locate the housing onto the block. Install the clutch housing bolts and torque to 75 Nm (54 ft-lb).
15. Position the release lever so that it aligns with the release lever pivot shaft opening in the clutch housing.
16. Slide the pivot shaft into the clutch housing until it is fully seated.
17. Install the pivot shaft retaining screw and torque to 9.5 Nm (7 ft-lb). Tighten locking nut against the clutch housing and torque to 7.5 Nm (6 ft-lb).
18. Push the central tube forward and bolt to the clutch housing. Leave the mounting bolts loose until the transaxle is installed.
19. Install the transaxle carrier. Torque the transaxle carrier to body bolts to 46 Nm (33 ft-lb).
20. Using [TRANS-03](#), install the transaxle.
21. On turbocharged cars, install the wastegate. Do not tighten mounting bracket bolts until the exhaust system is completely installed.
22. Install the clutch slave cylinder. Torque the mounting bolts to 21 Nm (15 ft-lb).
23. Install the starter and attach wiring harness. Torque starter mounting bolts to 45 Nm (32 ft-lb). Install starter heat shield (if equipped).

24. Attach the starter wiring harness to clutch housing at two attaching points with sleeve clamps.
25. If equipped with support between the engine casing and clutch housing (early vehicles), install support and torque bolts to 42 Nm (30 ft-lb).
26. Attach ground straps at the top of the clutch housings. Cover access opening in clutch housing with tape to avoid dropping washers into the flywheel. (Note: I found it much easier to do this if I disconnected the heater control valve hose from the engine and held it out of the way.)
27. Install the exhaust system hangers onto the torque tube.
28. Install the sections of the exhaust system removed for the clutch replacement using [EXH-01](#).
29. Install the speed and reference sensors using [IGN-02](#).
30. Attach the two ground wires to the top of the clutch housing (near the speed and reference sensors).
31. Install belly pan.
32. Connect battery.

Clark's Garage © 1998
