

The Greasy Hands Garage Guide to Rebuilding the Triumph TR Transmission Part 1 - Disassembly

Some of the disassembly steps do not have to be in the exact order given below, but this is the order we like to use.

Step 1 – Drain the oil and remove the top cover

Before starting, drain the oil out of the transmission. Then remove the transmission top cover by removing the eight bolts.

Step 2 – Check the Synchronizers

Wear on the synchro rings should be checked before disassembly. Remove the slack by pushing the synchro hub toward the ring and then measure the clearance with a feeler gauge. The Service Instruction Manual states that the clearance should be 0.035 to 0.040 for new rings and they should be replaced if the clearance is less than 0.030. Some of the new synchro rings are of dubious quality, so we normally reuse the synchro rings if they meet this criterion.



Step 3 – Remove the Rear Flange

If you have an impact wrench, you can usually just hold the flange with your hand while you remove the nut. If you use an ordinary wrench, you'll probably need some sort of flange holding tool. Sam had this nice tool made, but you could also make one by drilling two holes in a piece of angle iron. Once the nut and washer are removed, you can tap the flange off with a small hammer or use a puller if it's stubborn. The photos show flange removal for an overdrive, which could be done as a later step.



Step 4 – Remove the speedometer drive

When there is no overdrive, the speedometer drive must be removed before the rear housing, otherwise you will destroy it (guess how we know this). If you have an overdrive, be sure to remove the speedometer drive before dismantling the rear housing. First remove the set screw. Early drives with the brass housing can be removed with a pair of pliers or a thin wrench. The later drives don't stick out from the case, so they can be removed by prying up on the end of an old speedometer cable.



Step 5 – Remove the rear housing or overdrive

Next, remove the rear housing or if an overdrive is installed, remove it (see Overdrive Disassembly). Remove the bolts that attach the rear housing to the back of the transmission. The housing has a lip near the end that can be grabbed by a bearing separator and pulled using an assembly like that in the right photo. This is my poboy puller, since all items in the assembly are from a discount tool house, except for the angle iron plate, which was easy to make.



Step 6 – Remove clutch shaft and fork

If you have an early transmission with set screws that hold the shaft in position, remove them. The clutch fork is held on the shaft by a pin which is frequently broken. They usually break where the pin enters the shaft, so you can't get the fork off until you get the remains of the pin out. The orientation of the pin makes it difficult to remove the remains of a broken pin. The trick is to drill through the back side of the fork and knock the pin out with a punch. You must drill at an angle so that the drill bit will intersect the remains of the pin, which goes all the way through the shaft. It is difficult to get the right angle because the ends of the clutch fork interfere with the drill.



Our TR4 project transmission had a broken pin. We first drilled with a 3/16" bit, but only caught the edge of the pin, so we tried again with a 1/4" bit. The second attempt intersected the pin. We've done this successfully in the past, but had trouble this time. Obviously, you can't really see what's going on until you do a post mortem investigation. In this case the fork was loose enough on the shaft that we had difficulty aligning the fork and the shaft so that we could knock the pin

out. We finally gave up and cut the shaft. Once we had it out, it was easy to get things lined up and knock the pin out. The photo shows the broken pin next to a new one.



Step 7 – Remove the front and countershaft covers

Remove the four bolts holding the input shaft front cover and the two bolts holding the counter shaft cover and remove both covers

Step 8 – Remove the countershaft

First, free the countershaft from its retaining mechanism. Early countershafts are retained by a long set screw that holds both the reverse shaft and the countershaft. Later models used a large phillips head screw that holds a retaining plate. This screw is sometimes difficult to remove. If you can't get it loose with a screw driver, you might try using a socket wrench or an impact screwdriver (see photos).





The countershaft can now be pushed out the back of the transmission with a rod. Once it is removed the countershaft gear cluster will fall to the bottom of the case.

The early transmissions used loose needle bearing on the countershaft. In order to retain the needle bearings, cut a 3/4" OD rod or pipe to a length of about 6 1/4". Push the countershaft out with the rod and leave it inside the counter shaft gear cluster.

The photos show some countershafts removed from various transmissions. Most of the wear is at the rear bearing under first gear.

The early transmissions with needle bearings usually show less wear than the later transmissions. The shaft on the right came out of our TR6 project transmission. This transmission had fewer than 10,000 miles on a rebuild that used a new countershaft and new shell type bearings. The rear bearing had failed completely - only crumbs remained. The silvery sludge was scooped from the bottom of the rear housing.





Step 9 – Remove the input shaft



Step 10 – Remove the center bearing



Step 7 – Remove the output shaft and countershaft gears



Step x – Remove Countershaft Bearings

The following photo shows the three types of countershaft bearings: (1) 24 loose needle bearings, (2) shell bearing with 18 needles and (3) cage with 15 needles.



Step x – Remove input shaft bearing



Step x – Input shaft pilot bearing



Step x – Remove mainshaft gears



References