

The Porsche Type-915 Transmission - Part II

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Since 1972 the 915 transmission has been built in many versions, including 4-speed models, and some fitted with oil pumps, limited slip differentials, and special-order ratios. As time passed, and emissions and fuel economy became more and more important, Porsche honed their 915-production down to RoW (Rest of World) and USA versions. Porsche literature shows 4-speed production ended in 1977, and the vast majority of 915 transmissions in use today are 5-speed, aluminum housing units. Basic 5-speed types one might encounter on USA delivery, and a handful of gray-market, cars are:

1972/73 – 915/02

1974 – 915/06

1975 – 915/40

1976 – 915/44

1977 – 915/61

1978/79 – 915/61

1980-83 – 915/63 (RoW – 915/62)

1984 – 915/68 (RoW – 915/67, RoW Turbo Look - 915/69, USA Turbo Look – 915/70)

1985/86 – 915/73 (RoW – 915/72)

Type and serial numbers may be found on a raised aluminum surface on the bottom of the differential housing. If you found the drain plug, you found the numbers. Be aware that because of the location the numbers might be ground off, especially on cars with a very low ride height. Look carefully; you will see “915/63” to the left side of the raised boss.



1972 through early production 1977 models had magnesium housings (cases); all later 915s had aluminum housings. 1972-75 models used a mechanical drive for the car's speedometer, replaced with an electronic unit in 1976. 1972-74 versions were the only 915s fitted with a 7:31 ring and pinion ratio. The above type-numbers might carry over, or carry back, to another model year; sometimes with Porsche nothing is certain.

OK, where were we? Just kidding, let's remove the center housing, the gear cluster and the differential and see what we've got (will this transmission be reduced to a parts bin or live again?). Remove the four, 8mm (13mm wrench size) nuts that secure the shift fork plate to the bottom of the center housing.



You will see a couple of places on the small casting that will allow you to use a small pry tool to work the cover loose. A thin, long, flat-bladed screwdriver works well for this. If the transmission is not in neutral the fork, on the inside of the plate, can stick and will probably need a little gentle coaxing. Find the long rod that protrudes from the bottom of the center housing; it's usually called the shift rod. Wiggling that rod, and moving it forward and back can help to release the fork and cover. If the transmission is in neutral the cover will probably just fall off once it's free of its two dowel pins. This is what it looks like.



This might be a good time to back up and review what "neutral" is. When the sliding sleeves for gears 1/2, 3/4, and 5/R are all in their middle positions the transmission is in neutral. After the 5th/R gears have been removed neutral can be checked without looking inside the center housing. You will see two shafts, to the left of the pinion shaft, which protrude into the nose cover's chamber.



If the two shafts appear as pictured the gear cluster inside the housing is in neutral. If one shaft protrudes about 10-12mm further than the other, or if the tip of one shaft sits approximately flush with the housing, the transmission is in gear.

Let's take off the center housing. Remove all of the 8mm (13mm wrench size) nuts that secure the housing to the differential housing. Use a mallet and gently tap, as pictured, in a few places, as needed, to loosen it.



To remove, place your left hand under the housing and gently pull it off; the shift rod will come with it. Set the housing aside and check out 1st-4th gear sets! Depending why your transmission is apart this is when you usually find most of the carnage. Our subject transmission is a pleasant surprise, at first glance I see bad dog teeth on 1st, worn synchro rings, and...not much else!

Remove the ten 8mm (13mm wrench size) nuts that hold the bearing clamping plates to the differential housing.



It's a good technique to loosen the nuts with the box end of your wrench, then remove them with the open end of the wrench.

Remove the 1/2 shift fork bolt using a 13mm wrench.



Remove the 3/4 shift rod detent and spring by removing the upper threaded plug on the side of the differential housing.





A 17mm wrench and small magnet will serve you well with this procedure.

Cradle the gears on the pinion shaft with your left hand, and pull the entire gear cluster away from the differential housing. The 1/2 shift fork will slide off its shaft, but you might encounter some difficulty. Gentle rocking of the assembly, while watching individual gear set alignment, will help with removal. The factory manual mentions that the opening in the fork (at the bolt hole) can be gently spread apart slightly to assist with removal. The 3/4 shaft/fork will come with the main shaft. Have a clean place designated to put the parts; you want to keep them together for now.

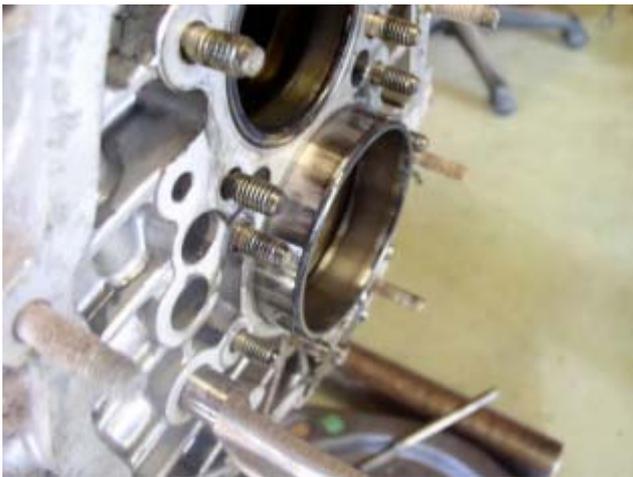


After gear cluster removal the pinion depth shims, see the next picture, can be carefully removed.



If there is more than one shim (typical) they will probably stick together. Leave them stuck, we'll clean and measure them later. If there are people that work and play in your work area, and they might think that it would be cool to pick up the shims and play with them, secure them with a wire ty-rap or twist tie; and hide them.

Now we can check for the only true weak spot inside the 915 transmission; the rear pinion shaft bearing location in the differential housing, which wears out and allows the bearing race to get loose. And, yes, the bearing race in our subject is loose, but the truth of the matter is that this was completely expected. The bearing race pictured was able to be removed using only fingertips.



That leaves us with a diff housing that will require a very specialized machine shop procedure – the installation of a custom shim that will reinforce the opening so that a new bearing may be installed at sufficient press to be tight, and stay tight. The next chore is to remove the axle flanges. I do this by screwing a couple of 8mm bolts into any two adjacent CV joint bolt holes, just a few threads, and use them, with a large screwdriver, to hold the flange. A ½" drive breaker bar, a short extension, and a 17mm socket do the hard work. The torque spec for these bolts is only about 30 lb/ft, but one of our subject's bolts was so tight (probably installed using an impact wrench by a mechanic who was in a hurry following seal replacement) that we almost fired up the compressor for the impact wrench.



Once the flanges are removed the differential side cover will come off. Remove all of the 8mm (13mm wrench size) nuts, and use a soft mallet to tap against the small overhangs provided.





Care must be taken to watch the cover as it lifts away from the housing because it can easily get cocked to one side, which might cause damage. Sometimes the side cover is extremely tight, patience is your friend. Work slowly until it comes free from the housing. Use a dentist's pick, or similar, to remove the o-ring...



...and use a punch or large screwdriver to remove the flange seal (support the cover on a couple short pieces of 2x4).



Set the cover aside.

Place one axle flange on a clean surface, flange side down.



Put the remaining axle flange into the differential carrier, and snug down the bolt for it by hand. Use the flange to lift the carrier/ring gear assembly out of the housing and place it on the other axle flange.



Why place the diff on the flange? Never set anything, these parts are heavy, on an unsupported bearing, which could damage the bearing (you might choose to re-use the carrier bearings).

Before the differential housing can be shipped to the machine shop a couple more items need attention. We have to remove the remaining axle flange seal from the housing, remove the throw out bearing guide tube (two screws), and remove the clutch release fork (1 split pin).





When you drive out the release fork pin be sure to hold the fork at the pictured angle, otherwise you will drive the pin into the aluminum below the fork. Once the screws are removed from the TOB (throw out bearing) guide tube, use your mallet to gently tap the tube from inside the housing. It has an o-ring so it might take a few taps.

This is a good place to end Part Deux of this tutorial. Don't put away the latex gloves; we still have dirty work to do!