

Corvair Manual Shifting Transaxle - Transmission and Differential Variations

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The Corvair uses a transaxle that is a transmission bolted to the differential as one unit. The transaxle is bolted to the engine and the other end is bolted to a support that attaches to the body. Chevrolet made changes to the manual shifting transmission and differential during the years the Corvair was manufactured requiring different transaxle supports. The transmission and differential were assembled with different gear ratios depending on model year and options. The improper combination of parts can result in the transaxle malfunctioning.

This article's information is for someone with an average automotive understanding. Different publications and Corvair transmission expert Dan Drommerhausen were consulted in an attempt to minimize incorrect information. Shop manuals and books can be consulted for more detailed information. This article won't discuss the automatic (Powerglide) transaxle. The Greenbrier and Rampside "FC" vehicle transaxles will not be mentioned. A qualified, and knowledgeable, Corvair transaxle expert should be consulted for FC transaxle identifications or repairs.

What to do when the transmission or differential malfunction. - Decades past it was fairly easy to purchase a good used replacement and install it. Now good used replacements are difficult to locate. A used transmission or differential should be inspected by a qualified Corvair transmission expert to make sure it is functional before it is installed. The other option is to purchase a repaired/rebuilt unit. Not all Corvair transmissions and differentials are compatible with each other. Some information regarding what transmissions and differentials can be used with each other for different model years will be provided here. Other publications and/or a qualified Corvair transaxle mechanic can be consulted. NOTE: You may find out of date information regarding installing model years 1966 -1969 transmissions on 1965 and older Corvairs differentials. As stated herein, it will result in a transaxle failure unless modifications are made by a skilled technician!

The "Saginaw" - All Corvair transmissions were produced by the GM Saginaw Division. However, the term "Saginaw" is typically used to describe the 1966-69 model year transmissions. The heavily revised 1966 model year transaxle design was based on GM's, then new, Saginaw three and four speed transmissions used in GM front engine products. While based on the new GM Saginaw front engine transmission, many of the parts used in the Corvair "Saginaw" are different. Installing a "Saginaw" 1966-1969 transmission on a 1965 or older differential will cause it to fail!! Only an experienced and skilled Corvair technician, qualified to make modifications, can accomplish this at considerable cost!

Synchronized?? - The term "Synchronized" means you can shift gears (with the clutch "in" or disengaged) easily without gear clash. This was an early 1900's invention that allowed the average person to shift gears smoothly. The Corvair 1960 through 1965 model year three speed transmissions have synchronized second and third gears, but NOT first gear. That means the car has to come to a stop to select first gear without gear clash. The 1966 through 1969 model year three speed transmission first, second, and third gears are synchronized. ALL Corvair four speed transmissions have the four forward gears synchronized. None of the Corvair transmissions have a synchronized reverse gear.

Differential Ring and Pinion shaft - When the "Saginaw" transmission was implemented for the 1966 model year the differential pinion shaft was changed to be "slightly" shorter. This was done to accommodate the new 1966 "Saginaw" transmission output shaft. Caution is required when replacing the pinion shaft when it wears out (the inner splines wear). NEVER use a pre-1966 model year differential pinion shaft in a 1966 - 1969 differential. It will cause a transaxle failure.

Positraction Differential - The "open" differential was the standard design which allows the outside rear wheel to turn faster versus the inside rear wheel as the vehicle travels through a turn. Unfortunately, if one rear wheel is on a slippery surface and spins, the opposite wheel won't move the car. Positraction was an option that is a slip clutch between the two wheels that allow them move at different speeds in a turn, but if one wheel spins on a slippery surface the opposite wheel will still provide some driving force to move the vehicle. Positraction differentials use many unique parts, some are not readily available for repairs. The "first" design was used through 1964 and some consider it "fragile". The 1965 model year "second" design was improved and used through 1969. Installing the "second" design in a 1964 or older differential case should ONLY be done by a knowledgeable Corvair transaxle mechanic as modifications are required. Contrary to some Corvair documentation, do NOT use a "special" Positraction lubricant as it can interfere with the transmission synchronizers (the transmission and differential share the same lubricant). Replacing transaxle gear lubricant is suggested every 12,000 miles to prevent Positraction differential clutch noise when the car moves through a turn.

Case bolts, four vs. six - The 1960 through 1965 model year transmissions and differentials were bolted together using FOUR bolts. The 1966 through 1969 model year transmissions and differentials were bolted together using SIX bolts.

Transmission Input Shaft - The shaft transmits engine power from the engine and clutch, through the differential, and into the transmission. The correct one **MUST** be used with the corresponding model year transmission!

1960 - 63 Three speed transmission - 12 splines, length = 21.75" (21-3/4")

1960 - 63 Four speed transmission - 12 splines, length = 23.25" (23-1/4")

1964 - 65 Three speed transmission - 14 splines, length = 21.75" (21-3/4")

1964 - 65 Four speed transmission - 14 splines, length = 23.3125" (23-5/16")

1966 - 69 Three AND four speed transmissions - 14 splines, length = 24.375" (24-3/8")

NOTE: 14 spline shafts have a larger diameter versus 12 spline shafts. The 12 and 14 splined shafts use different seals.

1960 - Initially the Corvair was designed to use only a Powerglide automatic transmission. Chevrolet marketing discovered the "competition" was offering a manual transmission as standard equipment and selling their automatic transmissions as an extra cost option that undercut the Corvairs base price! The Chevrolet engineers were told to "add" a manual three speed transmission to the Corvair as standard equipment and make the Powerglide an option. This "late in the design cycle" decision resulted in Corvair's unusual three-piece flywheel per Chevrolet engineer Mr. Benzinger.

Transmission - The three speed transmission used an aluminum case. It will not fit 1961 - 69 differentials.

Differential - ONLY the 1960 transmission fits the 1960 model year differential unless modifications are made.

1961 - The four speed transmission was introduced as an extra cost option. The three speed was standard equipment.

Transmission: The three speed output shaft was revised and the case was changed from aluminum to cast iron. The new four speed had all forward gears synchronized. The 1961 model 4 speed transmission is not well regarded.

Differential: The differential ring and pinion shaft was changed to accept the revised transmission output shaft.

1962 - Many transaxle changes were incorporated during the entire model year to address complaints about shifting issues. **NOTE:** Any 1962 model year transmission should be inspected by a knowledgeable Corvair transmission mechanic to determine if the transmission has all the improvements. If not, all the year's improvements can be incorporated during repairs. The transmission and differential gear fill holes were both raised to improve lubrication.

Transmission: One major change was the four speed's 1-2 and 3-4 gear assemblies, including some synchronizer parts, that were revised to improve shifting.

Differential: The differential case gear oil fill hole was raised and a larger oil fill plug was used.

1963 - The transmission case was re-designed. The ID number boss location was moved below the access plate.

Transmission: The gear shifting mechanism was revised to reduce premature wear and required a case change.

1964 - Many improvements were made to the 1964 Corvair. The engine was larger and the rear suspension was revised requiring transaxle changes. The flywheel, pressure plate, throwout bearing, bell housing, and crankshaft gear were revised to improve clutch engagement during high engine RPM shifting.

Transmission: There was a 1st and 2nd design with different internal parts requiring a qualified mechanic to identify because mis-matched parts will cause a transmission failure! This transmission accommodated increased engine power and shifted smoother. The transmission case drain plug was eliminated.

Differential: The addition of the new rear suspension transverse leaf spring required revising the differential case so a bracket could be bolted to its bottom. This revised case was **ONLY** used on the 1964 model year cars. The differential drain plug was eliminated. A dipstick was added to check the differential gear oil level.

1965 - The 1964 model year transmission revisions were carried over for the 1965 model year. The differential case was revised for the new IRS rear suspension and to eliminate the speedometer drive because the speedometer was driven by the front driver's side wheel.

Transmission: No changes from the 1964 model year 2nd design.

Differential: The differential case was revised to work with the new independent rear suspension design. The ring and pinion shaft is a **ONE YEAR ONLY** design. The differential ring and pinion shaft does not have a speedometer drive gear and is too long to use in the with the 1966-69 transmissions (**NEVER** install a 1960 - 1965 pinion shaft in a 1966-69 differential). This was the last year for the differential dipstick. The differential ring to carrier bolts increased from six (1960 - 1964) to nine bolts (1965 - 1969). The axle half shaft yokes to differential gear carrier design was changed.

1966 - The 1966 model year three and four speed transmission support were redesigned as was the rear shifter tube support to accommodate the revised three and four speed transmissions.

Transmission: The three speed now had a synchronized first gear for the first time. The "Saginaw" 3 and 4 speed transmissions **WILL** fail if bolted to a pre-1966 differential without considerable modifications.

Differential: The axle half shaft yokes were revised to use larger shouldered bolts to retain the U-joints.

1967 - 69 There were only minor internal transaxle changes. While not specifically part of the transaxle. The clutch cable end was revised at the pedal assembly for the 1969 model year.