

Introduction

This guide will show the installation of Novak adapter assemblies to the Jeep Dana 300 transfer case.

Transfer Case Versions

All Jeep models of the Dana 300 transfer cases are compatible with this adapter assembly. IH versions of these transfer cases are not compatible.

Transfer Case Input Shaft

The included Dana 300 input shaft is machined from triple-alloy gear steel. This 32 spline version installs easily and quickly, replacing the factory 23 spline input shaft for a direct connection to the 4wd style transmission output shaft, as discussed above.

Transfer Case Strength and Condition

The Dana 300 transfer case is well matched to conversion transmissions. The 300 is uncommonly strong, compact and servicable. They are capable of power ranging up through V6s, V8s and even the Chevy Big Blocks.

It is not requisite that you rebuild your transfer case to successfully complete the conversion, but it may be a good time to do so if your transfer case leaks or has many miles of service. We've made our Dana 300 gaskets & seals kits and our all-inclusive master rebuild kits available for this purpose.

Transfer Case Shifter

This transmission conversion will allow for the retention of the factory shifters, or allow you to upgrade to a twin-stick shifter.

Driveshafts

Driveshaft length changes are often required, as this geartrain combination is virtually always longer than some factory Jeep combinations. Some GM engine installations sit further ahead in the bay and will allow for better driveshaft angles than with AMC installations.

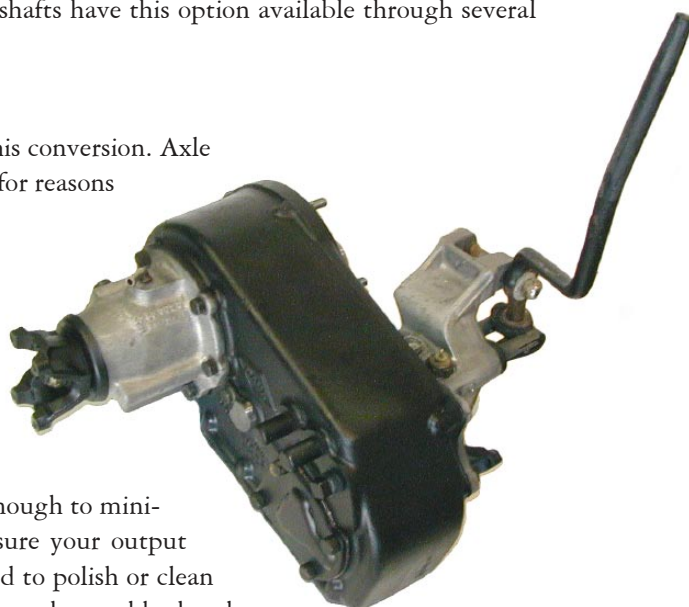
Some of our customers, fearful at the perceived expense of new or modified driveshafts, attempt to let the existing driveshafts dictate engine, transmission and transfer case location, sometimes to the detriment of the project. Driveshaft modifications are usually inexpensive when performed by driveline, RV or tractor implement specialists. New driveshafts are an option but seldom a requirement in regards to the actual successful conversion. Jeeps that require extensive travel or specialty-built driveshafts have this option available through several fabricators across the nation.

Axles

Use of factory axles is completely acceptable with this conversion. Axle upgrades are not necessary, but they may be chosen for reasons external to this transmission upgrade.

Conversion Procedure

First, you should trial fit the new input shaft to the transmission output shaft to verify proper spline fit. Pay particular attention to the spined shafts and how they mate up. There is a certain amount of variation in factory shafts due to wear and other factors. We have splined our shaft tight enough to minimize both wear and the risks of breakage. Make sure your output shaft splines are clean and free of rust. You may need to polish or clean the factory splines. Do make sure they slide nicely together and by hand.



If the shaft mating seems somewhat loose, remember that the involute form of splines cause the two shafts to self-center when transferring power.

Removing the Transfer Case Input Shaft

If applicable as described above, replace your Dana 300 input shaft. Removal and disassembly of the input retainer assembly is required. This is a simple process and is done as follows:

Having removed the transfer case from the transmission and the Jeep, drain its fluid and bench the transfer case.

Remove the two studs from the mounting face of the transfer case. Some transfer cases use six bolts instead of studs. Next, remove the six socket head bolts from the transfer case input bearing cap using a 3/16" hex (Allen®) wrench. Gently tap the retainer with a soft mallet to break any adherence to the transfer case bore.



Carefully pry the front bearing cap assembly from the transfer case using screw drivers or pry bars. You will notice that there are two notches for this purpose. It will remove as a unit consisting of the input gear, shaft, bearing, seal and retainer. Nothing should fall apart or out of the



transfer case.

Disassemble the front retainer by removing the rear snap ring. Now remove the gear. These splines are not usually overly tight and removal should be easy.

With the gear removed, now remove the large retaining ring that holds the bearing in the retainer bore. Remove the shaft with its bearing. Press the bearing off the shaft. If the input bearing in the Dana 300 retainer is to be replaced, now is the time.

Installing the New Transfer Case Input Shaft

Set the old input shaft aside and get the new one. As with all splines, test fit the Dana 300 input gear splines to the shaft. Fit should be snug, but not exorbitantly tight.

Dana used shims on the shoulder of the input shaft to prevent the heli-



Dana 300 4:1 Low Gears Caveat

4:1 gearsets will require an additional step over the factory Dana 300 gearset. The input shaft and gear assembly cannot be pulled out of the front of the case bore unless the intermediate gear has been removed. This will require that the transfer case bottom pan be removed, and the intermediate idler shaft be removed by being driven out *rearward*.

Once this step is completed, you will be able to remove your input gear assembly and proceed as directed.



cal gear from thrusting up and down the input shaft while under substantial its forces. Your goal here is to totally minimize the gear's end play. As a rule of thumb, install as many shims as possible and still be able to install the gear's retaining ring. It is easiest to set this up empirically, using calipers. You will measure the input shaft from the bearing shoulder to the rear of the retaining ring groove, as shown in the image. You should get 2.498" to 2.501". Now measure the stackup, including: the input bearing, input gear, snap ring and shims. Add or remove shims until you have acheived a number just .001" to .003" shy of this ~2.500" measurement. You can then proceed with the assembly of the input shaft assembly.



Install your shims on the input bearing journal. Press the input bearing on the input shaft. Then lube the seal and

shaft on the seal journal. Press the shaft and bearing assembly into the retainer and install the retaining ring, which should just snap into the groove, assuredly but with a bit of drag if you've set up your shims correctly.



Put a thin coat of assembly lube on the male and female splines of the input shaft that engage the transfer case input gear splines and transmission output shaft splines. This protects the splines during the initial run. We do not recommend the use of grease, as it could foul the flow in manual and especially automatic transmissions, causing significant damage.

Install the input gear on the input shaft. Remember that the helical teeth face forward and the clutch teeth face rearward. Follow up by installing the gear-to-shaft snap ring. The transfer case input assembly should now be completely assembled.



Transfer Case Face Preparation

Prepare the transfer case for assembly to the adapter by cleaning the transfer case surface with sandpaper and a small block of wood. Sand the mounting face of the



transfer case until it is absolutely clean of dirt and rust. This step is important to insure a proper seal between the adapter and transfer case. The Jeep factory adapter did not use a gasket at this location and the mounting face of the transfer case may have accumulated a considerable amount of rust and dirt.

Input Shaft Assembly Installation (if applicable)

For an extra measure of sealing, you may wish to install a small bead of RTV or other sealant to the flange / journal of the input bearing retainer. Now insert the input shaft assembly into the input bore of the transfer case. Rotate the retainer until the bolt holes align. Lightly and squarely tap the retainer into place until it seats. Thread in the six socket head bolts into the transfer case.

Do not use these bolts to seat the retainer. If there is any obstruction, eliminate it and retry.



Torque the bolts evenly and in three sequential stages to 7-8 ft. lbs.

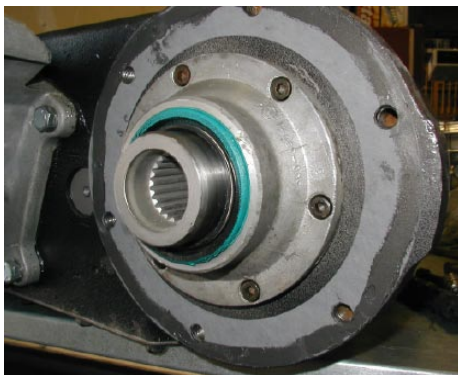
Transfer Case to Adapter Installation

The six bolt holes in the face of the transfer case are phased to prevent installation in all but one orientation. Align one of the provided gaskets to these holes.

Install the adapter clocked to your preferences. Note that the Dana 300 has two bolt holes in its mounting face that are shallower (#5 & #6) than the others. Additionally, the Novak adapter is thicker at the base, corresponding with the #4 hole. Install the provided 3/8"

hex bolts according to the layout as described and thread them into the transfer case. Tighten the bolts evenly and lightly and then follow up with an even and sequential cross-tightening of the six bolts to a final torque of ~38 ft. lbs.

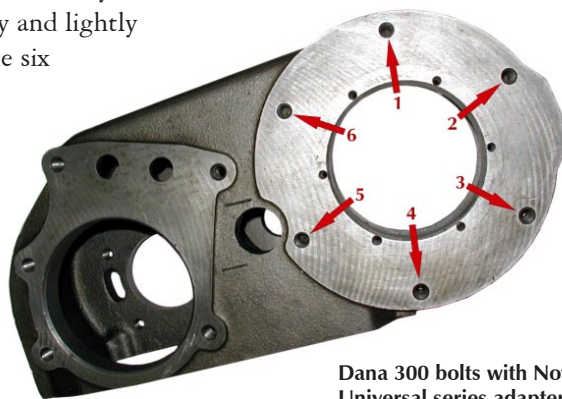
Conclusion



RTV on the gasket as shown in this images is optional. The Dana 300 input oil seal will retain the transfer case fluid within, and the seal in the Novak adapter will seal the transmission fluids, using the input seal journal. The cavity of the Novak adapter should be a dry cavity as long as the seals maintain their integrity.

While reading through these instructions, and especially while performing the transmission swap, it is often recognized that it is not the swap itself that provides the greatest difficulty, but in the ancillary things like linkages, mounts, clearances, and the like. Any good installation should consider all the points in this article and also allow for time, energy and funds for the dozens of variations in drivetrain conversions that cannot be anticipated.

We strongly suggest that you keep these instructions and the following, associated parts list for future reference. For questions concerning your conversion, contact us and we'll be happy to assist.



Dana 300 bolts with Novak Universal series adapters:

3/8" bolt lengths

#1: 1-3/4"

#2: 1-3/4"

#3: 1-3/4"

#4: 2"

#5: 1-1/2"

#6: 1-1/2"



We've had many customers request it, and we've made available our Dana Model 300 Master Rebuild, kit #300MR, plus several other components for the 300. We welcome you to call us or see our website for details.

Full dissassembly of the D300 is not required for this conversion, but many individuals wanting an entirely fresh and optimized powertrain find this a good time to do so.

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