

Introduction

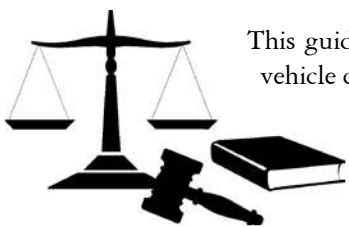
This guide will assist the installer in adapting the GM TH700R4 & Early 4L60E automatic transmission to the Jeep Dana Model 300 transfer case as found in 1980-1986 CJ Jeeps, and New Process transfer cases as found in 1980-1991 FSJ Jeeps.

Note to the Installer

This document and the use of any Novak products assumes safe and adequate working knowledge of the automotive systems involved. Vehicular repair, upgrade and conversion work can be among the most difficult of automotive mechanical and electrical tasks and it is upon the customer to ascertain whether they are working within their expertise or whether they should acquire assistance. Because Novak has no control over the customer's project procedures, Novak instructions and recommendations do not constitute a warranty of fitness, applicability or compatibility with the customer's particular project. Novak cannot determine the skill level of the customer and/or the installer of Novak products, nor can Novak publish all of the information on fundamentals that an installer should know before attempting these advanced procedures. While every attempt at informational accuracy has been made, these instructions and any recommendations therein are for guidance only. This guide is not intended to replace the service manual specific to your vehicle. It is not possible to document the wiring, routing and specific system details of every vehicle and the installer should obtain and use both their vehicle's manual and the engine or transmission donor vehicle's manual in conjunction with these instructions.

Your Legal Requirements

Novak products and procedures are intended and recommended for off-road use only and installation on a vehicle for use on public roads could violate laws within your jurisdiction. Additionally, installation of Novak products may adversely affect the warranty coverage on your vehicle.



This guide is not meant to explain, interpret nor notify the installer any laws concerning vehicle changes, engine conversions and the emissions systems surrounding them. It is the installer's responsibility to know and understand their local, state and national legal requirements and regulations and to make their installation conform to emission and vehicle safety demands of the jurisdictions in which the vehicle may operate. Novak does not rec-

ommend nor condone the disabling or modification of the vehicle or any system within it that could render it out of conformance with any laws in which the vehicle may be licensed or operate. Neither Novak Conversions nor its directors, principles nor employees are responsible for any changes made to your vehicle.

If you are performing a powertrain conversion and if your vehicle requires a referee inspection, you may wish to establish a rapport with them and discuss your plans and seek advice and approval from them prior to commencing your modifications.

These instructions and the products and



procedure described herein are offered only in accordance with the Novak policies and liability limitations found at: <http://www.novak-adapt.com/about/policies.htm>, which may supersede and prevail over these policies.

About the TH700R4 & Early 4L60E

The TH700R4 is an automatic shift, four-speed overdrive, longitudinally positioned transmission. It is now considered to be one of the finest over-drive automatic transmissions ever produced.

The Turbo 700 was introduced in 1982 as a response to fuel economy pressures, and to be phased in as the replacement for the TH350. The transmission was available for both car (RWD) and truck platforms. The transmission's principal new feature was its 30% overdrive. It also sported a lower-than-usual 3.06:1 first gear, popular for off-the-line acceleration as well as off-road torque.

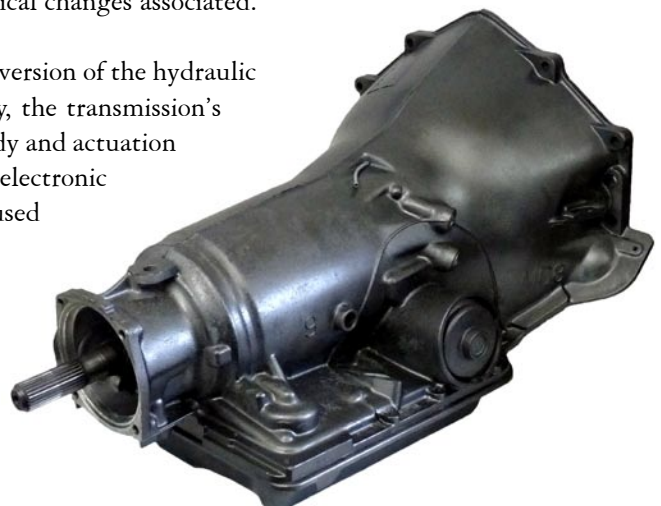


There were some initial bugs in the earlier versions. A feather in GM / HydraMatic's cap was the fact that they stuck with the 700R and followed through with improvements and upgrades. 1987 and newer transmissions are considered to be refined and very reliable, as indicated by their OEM installations against performance 350 V8s in sports cars and trucks. Earlier transmissions are affordably given all these upgrades to put them at the same high level of durable service and performance. Aftermarket building techniques and parts upgrades make this transmission very capable of Big Block power in race, street and off-road applications.

In 1990, the 700R4 was redesignated as the 4L60 (4-speeds, Longitudinally positioned, 6000 lbs. GVW). This was a change in name only with no significant mechanical changes associated.

In 1993, an important change did occur and that was the conversion of the hydraulic logic shifting system over to an electronic one. Mechanically, the transmission's power transmitting core remained the same, but the valve body and actuation system for the clutches, bands, etc. became controlled by electronic actuators and solenoids. A Vehicle Speed Sensor (VSS) was used as the primary feedback sensor, which fed the PCM or ECM (vehicle powertrain computer) the data to make shift decisions. The engineering of this system is not regarded as a complication, but an elegant simplification and further improvement to this transmission. This version is called the 4L60-E (or Early 4L60-E for our purposes).

In 1997, the 4L60-E began to be released having received



a redesigned case. This is the Later 4L60-E, and it is not compatible with this conversion.

Summary

GM's commitment to the 700R4 is apparent in its strength, quality and broad usability. It is hands-down one of the most respectable transmissions of our era, and a very compelling Jeep conversion transmission. The 700R is a very attractive swap option for all Jeeps, with the exception of the CJ5 and other short wheelbased Jeeps - due to powertrain length and driveshaft angle issues. Adaptability to nearly all Jeeps is exceptional.

About This Conversion

Our TH700R-4 to Dana 300 conversion makes for a very strong, and capable assembly both on-road and off-road, and it remains one of our most requested automatic transmission to transfer case combinations.

The Adapter

The Novak TH700R-4 / 4L60 to Jeep Model 300 transfer case adapter is very compact at only 3.1" long for a combined transmission and adapter length of 26.7". The adapter itself is cast and machined of a high-grade aluminum alloy, featuring thick flanges, a heavy cross-section and strength adding gussets.

700R-4 Versions

These kits are for the square, four-bolt tailhousing 700R-4 / 4L60 or 4L60-E, typically made through 1995. Some 1996 and later versions have a hex, six-bolt pattern tailhousing and removable bellhousing. See our Kit #4L63 if this describes your transmission.

We offer two adapter kits:

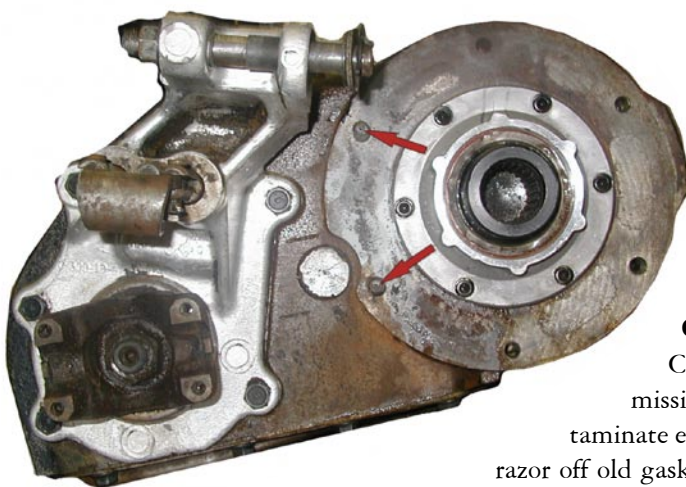
Option I is for the 700R4 (aka, 4L60), which is the conventional, hydraulically controlled transmission; kit #137.

Option II is for the 4L60-E, which is the electronically controlled version of the 4L60; kit #137-E, shown below, right. This version permits you to use the electronically controlled 4L60-E (four-bolt version) with your Dana 300 transfer case. Note that you will need to mildly modify the 4L60-E tailhousing (specific instructions, below) to install the included vehicle speed sensor (VSS). Also, make sure to plan on connecting your transmission to the GM ECM (if doing a GM engine swap) or get a standalone electronic transmission controller, available from GM, TCI, Jet, B&M and others.

Any version and year of the TH700R-4 can be adapted to the 300 transfer case, including "90 degree" (Gen. I, II, III V6 & V8 Small Block or Big Block engines) and "60 degree (early S10 Blazer 2.8L engine style)" versions of the 700, as determined by your choice of engine.

4wd versions of the Turbo 700R-4 / 4L60 and early 4L60-E are all ready to bolt up to our adapter kit as the required style of output shaft is already installed.

2wd transmission versions work equally well, but you will need to install a 4wd style transmission output shaft (image, below). We carry good, used GM shafts for this purpose and its installation and this requires disassembly of the transmission, and we recommend the services of a transmission professional. The basic installation is 2-3 hour bench job and may include simple gasket and seal replacements. Some choose this as the time for a more thorough master rebuild and update.



Assembly Procedure

Transfer Case Fasteners Removal

If you've not already done so, remove any bolts and studs that remain in the Dana 300, specifically those that may be in the 7 & 9 o'clock locations as shown in the adjacent illustration. This may be done with double nuts and wrenches, or with locking pliers.

Clean All Mating Surfaces, Splines & Threads

Clean all adapter mating surfaces on the rear face of the transmission as well as the transfer case input, being careful not to contaminate either of their internals with any particles. It may be necessary to razor off old gasket material and sealants. 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. File or sand flat if required. Follow up with a solvent, rag and compressed air as needed.

Clean and flush the transfer case input shaft spline bore using solvent and compressed air. You may use a small wire brush to clean the splines and any rust on them.

Clean and inspect all transmission and transfer case face threads. It may be necessary to run a threading tap for clean-up. In the event of severely damaged threads, thread repair inserts might be required. For individuals expecting severe duty from their TH700R4 / Dana 300 combo, it may be a good idea to use thread inserts in the four bolt holes of the transmission's aluminum flange, as the leverage forces of the transfer case on the transmission could, over time, cause the fasteners to loosen.

Adapter Test Fitment

Trial fit the adapter to the rear of the 700R transmission case, leaving the provided gasket off to make certain the adapter mates up easily and squarely. Make sure they fit firmly together by hand and with minimal resistance. At this test fitting stage or final assembly, never use the adapter bolts and force to bring the assembly together.

Then, test fit the adapter against the front face of the Dana 300. It should locate squarely onto the centering input bearing retainer and slide flatly against the transfer case input face. If it does not, check for any nicks or burrs and rectify as appropriate with a flat file or other means.

Transfer Case Input Shaft (for 137-B kits)

The included Dana 300 input shaft is machined from triple-alloy gear steel. This 27 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.



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 disassembly 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.

About Your Novak Adapter

The Novak #137 adapter kit is built to high standards of design, materials and build. The adapter housing is cast of high-grade aluminum and is gusseted for remarkable strength. Our shaft is machined of a high-grade alloy steel and specially hardened for strength and longevity. Your adapter kit has been shipped assembled with the seal.

The design of this adapter is such that it spaces the transfer case for optimal clearance. Note that you must also offset your engine 1" to 1.25" to the driver's side for proper pan-to-driveshaft and starter clearance.

Of interest is the clocking of the Dana 300 transfer case; we've achieved the optimum clocking for better ground clearance without compromising driveshaft to pan clearance. Note that you should use your stock size front drive yoke and shaft.

Novak warrants your adapter and shaft against defects of workmanship and materials for the life of the vehicle. This warranty is non-transferable and requires a copy of your invoice as documentation. These components are not warranted against damage or defects resulting from improper installation, including misalignment, improper assembly, improper mounting, or incorrect driveshaft lengths, and miscalculated driveshaft geometry on shackle reversal setups. Because we have no control over how the parts are handled or installed, we are not liable for any problems or failures of this product unless it is a defect of design, materials or workmanship. Determination of this warranty is at the discretion of Novak, Inc.

Should you have any questions concerning this conversion or these components, we welcome you to contact us.

It is not requisite that you rebuild your Dana 300 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.

Spline Shaft Test Fitment

Before the assembling of either your transmission or transfer case, test fit the transmission output shaft into the Novak Dana 300 input shaft to test for proper spline count and fit. Make sure they slide nicely together and by hand. The splines should slide together easily and have a discernible amount of rotational allowance (lash). 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.

Note that these are involute splines and are self-centering upon

transmission of power, but if the fit is too loose and sloppy, it may be possible that excessive input spline wear has occurred.

If the shafts don't fit together, check your spline count. It is possible that your transfer case has had an aftermarket conversion input shaft installed.

In either of the above scenarios, contact Novak and we'll assist anywhere we can.

Transfer Case Input Shaft Installation (For 137-B kits)

Removing the Transfer Case 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

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.

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 helical 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 achieved a number just .001" to .003" shy of this ~2.500" measurement. You can then proceed with 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.



Input Shaft Assembly Installation (if applicable)

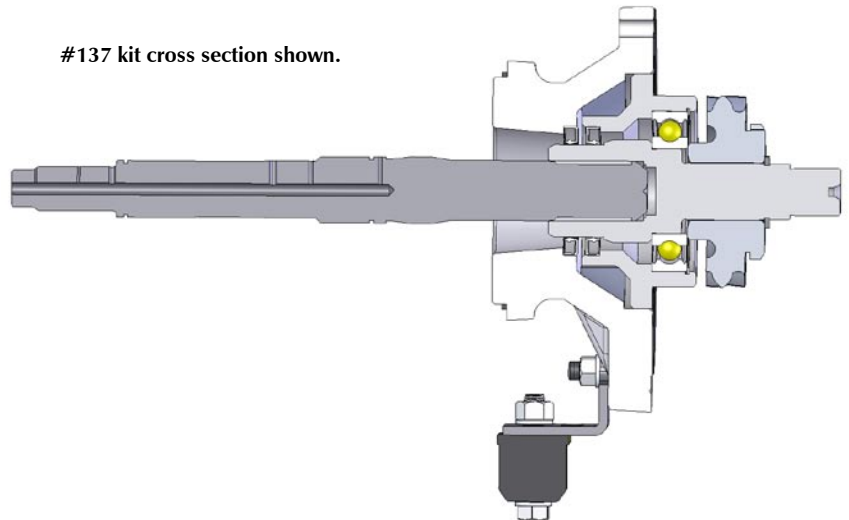
For an extra measure of sealing, you



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.

#137 kit cross section shown.



700R4 / 4L60, Non-Electronic Trans Install

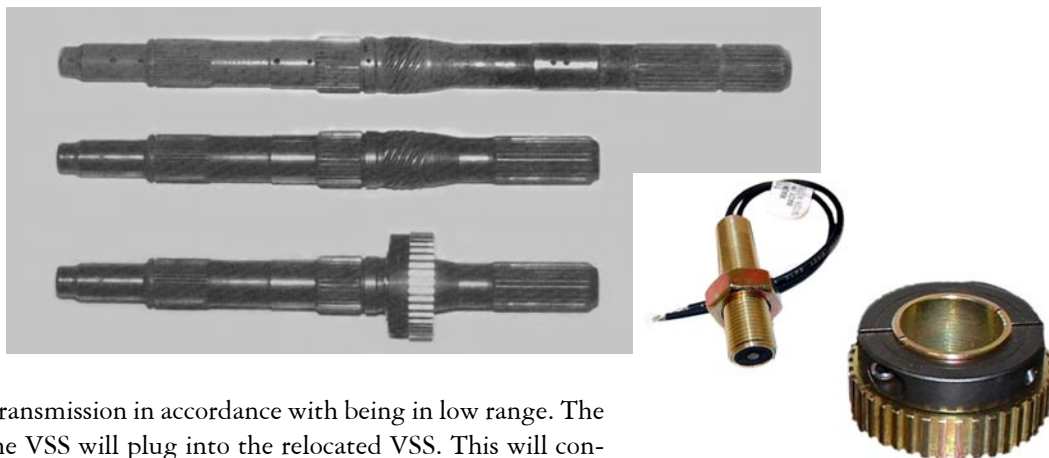
Novak's #137 kit is for the 700R4 aka 4L60 transmission, which is the conventional, hydraulically controlled transmission. No extra preparations are needed at this stage and you may skip the VSS discussion, below.

Early 4L60E VSS Installation Transmission Preparation

The available VSS kit #137VSS-A and #137VSS-B is for the 4L60-E, which is the electronically controlled version of the 4L60. This version permits you to use the electronically controlled 4L60-E (four-bolt version) with your Dana 300 transfer case. Note that you will need to mildly modify the 4L60-E tailhousing (instructions included) to install the included vehicle speed sensor (VSS). Also, make sure to plan on connecting your transmission to the GM ECM (if doing a GM engine swap) or get a standalone electronic transmission controller, available from GM, PCS, TCI, Jet, B&M and others.

4L60E Speed Sensor Kit Install

Placing the sensor onto the transmission output shaft simplifies the total installation over using a transfer case output shaft sensor and the attendant wiring and PCM complications compensating for low range function, and leaves the Jeep speedometer cable or signal available for its OEM gauges. Most stock GM transfer cases that have the speed sensor in the transfer case have a switch built into the shifter that signals the ECM to remap the functions of the transmission in accordance with being in low range. The original wiring for the VSS will plug into the relocated VSS. This will connect directly to the ECM (or to the DRAC module or its buffer), depending on your type of GM ECM.



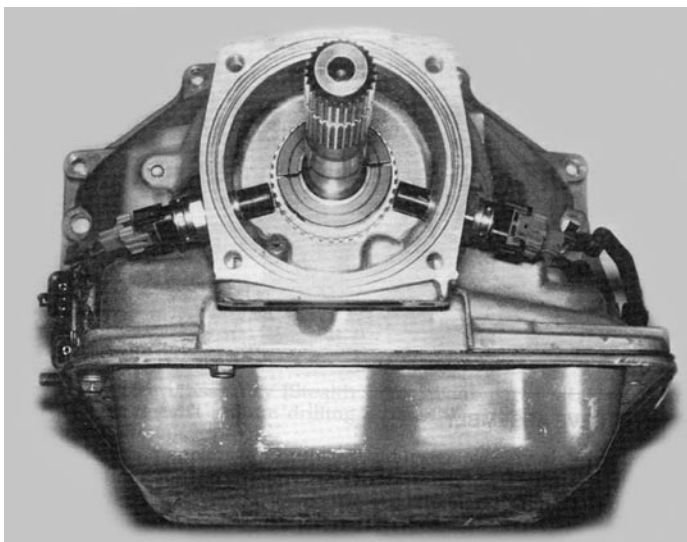
In the adjacent picture, a two-wheel-drive output shaft is shown on top. With 4wd applications, and the Novak conversions, a short output shaft is used.

4L60-E Reluctor Ring Install

In the unusual event you've installed a 700R4 4wd output shaft, featuring the spiral governor gear, into your 4L60E, you will use a reluctor ring with a 1.42" I.D. bore (#137VSS-B). This reluctor will be installed with the clamp ring oriented forward to prevent the assembly from coming loose in service.

Far more commonly, you will use the reluctor with the 1.30" bore (#137VSS-A) for the smooth journal shaft style that is native to the 4L60E. This assembly can be installed with the clamp ring rearward.

For either scenario, access to the Allen head bolts is through the rear of the transmission case and will have to be tightened more by feel than by sight.



Sensor Installation

As to radial orientation of the sensor, it can be either on the passenger's or driver's side, depending on the installer's wiring layout and considering the location of the shifter linkages. The sensor will need to be laterally positioned to be centered over the reluctor ring journal. Use a small scale or caliper to measure from a datum point such as the transmission case rear face. Using the same measurement, mark the outside of the case for drilling.

A few installers worry about drilling and tapping a hole into the transmission case. This is not a problem. The case is aluminum, and it is an easy job to drill and tap. The positioning of the hole is not that critical, and the drilling can be done with a hand-held electric drill. Just keep the drill and tap perpendicular to the centerline of the output shaft.

Ultimately you will drill and tap a 1/2"-20 UNF thread hole into the transmission case. Start with a small bit for best control, and work up or follow the tap manufacturer's recommendation. The wall thickness of the case is 5/16" in the areas shown, which gives plenty of thread engagement, given that this part should not be under any significant mechanical forces.

Prevent getting particles into the transmission by inserting a piece of tape over the oil return hole (about 1/2" diameter), and put a piece of tape over the oil spray hole. Use a vacuum adjacent to your drill bit while drilling to further minimize chances of chip contamination, then follow up with gentle compressed air. Wipe the area clean and remove the tape.

Now, verify that the output shaft is centered in the case. You can measure this with calipers or a very precise machinist's ruler using the transmission case rear index ring as a reference point. Next, coat the threads of the VSS with LockTite Blue and tighten it down until it just touches the reluctor ring. Now, back off 1/8 to 1/4 turn, and let the LockTite set-up. The gap is now .012" to .016" which is about ideal. After the LockTite has set-up. Spin the jam nut onto the sensor and snug it against the transmission case.

Now, wire the non-polar wire leads as per your diagram and harness. You should now be ready to continue with the installation of your transfer case adapter.

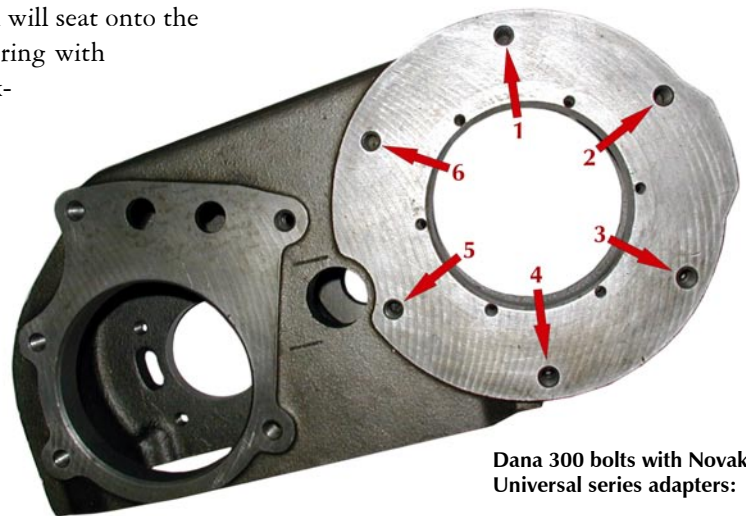
Note that this speed sensor set-up is smog legal in California and has been issued E.O. #D-371.

Adapter to Transmission Installation

Your adapter has been pre-assembled at our facility with its internal oil seal and we've included a new TH700R rear o-ring, which you will seat onto the shoulder of the adapter's locator step. Coating the o-ring with a *thin* coat of sealant is acceptable but be careful as excess sealant can escape into the transmission and



We've provided a vial of Permatex® Loctite Blue 243 thread locking compound. A drop or two per stud is recommended to prevent them from loosening under strenuous service.



Dana 300 bolts with Novak Universal series adapters:

3/8" bolt lengths

#1: 1-3/4"

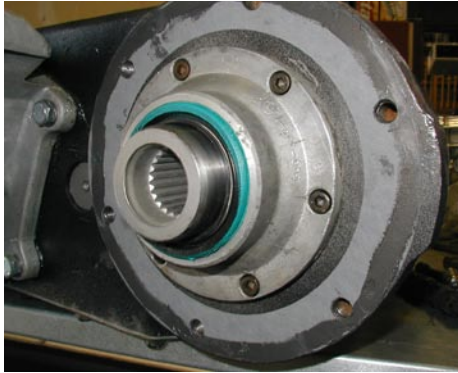
#2: 1-3/4"

#3: 1-3/4"

#4: 1-3/4"

#5: 1-1/2"

#6: 1-1/2"



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.

wreck it in operation by plugging fluid passage.

Thread the provided four M10 studs to full hole depth into the TH700R flange. We recommend the use of Permatex® Loctite Blue 243 thread locking compound. Fit the adapter to the transmission flange and install the lock washers, then nuts, tightening them in a crossing pattern in three successive stages until you've achieved 38 ft. lbs. of torque.

Transfer Case to Adapter Clocking & Installation

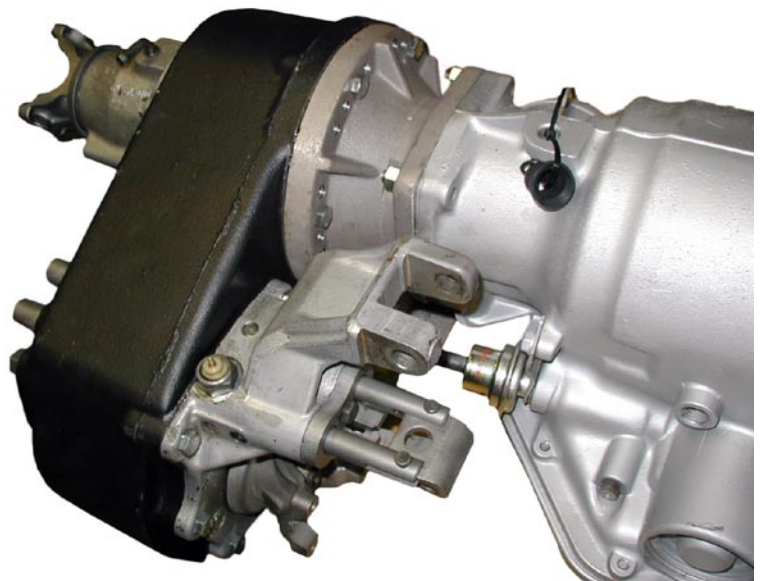
The six bolt holes in the face of the transfer case are phased to prevent installation in all but one orientation. A gasket that corresponds to this face has been provided, and is used primarily for a barrier between the adapter and transfer case face - more to keep contaminants out than keeping oil in, as the transmission output seal and transfer case input seals should sequester their fluids.

The adapter features an integrated transfer case clocking / rotation flange that allows the installer (driveshafts permitting) to choose the best angle for the Dana 300 from near-factory (20 degrees down) to near-flat (3 degrees down). However, transmission pan clearances and front axle width may inhibit the flatter options. No purchase of a separate clocking ring - and the associated additional expense and geartrain length - is required.

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.

Splines Lubrication

The transmission output shaft splines and transfer case input shaft splines should be pre-lubricated prior to assembly for start-up usage. Use an assembly lubricant only. Do not use grease or any other substance that will not properly dissolve into the transmission fluid. Upon filling and operating the TH700R4, the splines will then be continuously exposed to ATF and well lubricated.



TH350 shown. 700R is similar.

Transfer Case Shifter

This transmission conversion will allow for the retention of the factory shifters, or allow you to upgrade to a twin-stick or other known aftermarket shifters. Because this transmission combination can be long, the factory or some direct-mount aftermarket twin-stick shifters may be back too far to come up through the floor in the tunnel cover. In this scenario, we recommend a Currie® Twin Stick

Transmission Shifter

A broad variety of transmission shifters are compatible with this conversion, ranging from console shifters (i.e.; Art Carr, B&M, etc.), to direct-mount stick shifters (i.e.; Gennie, Lokar, etc.).

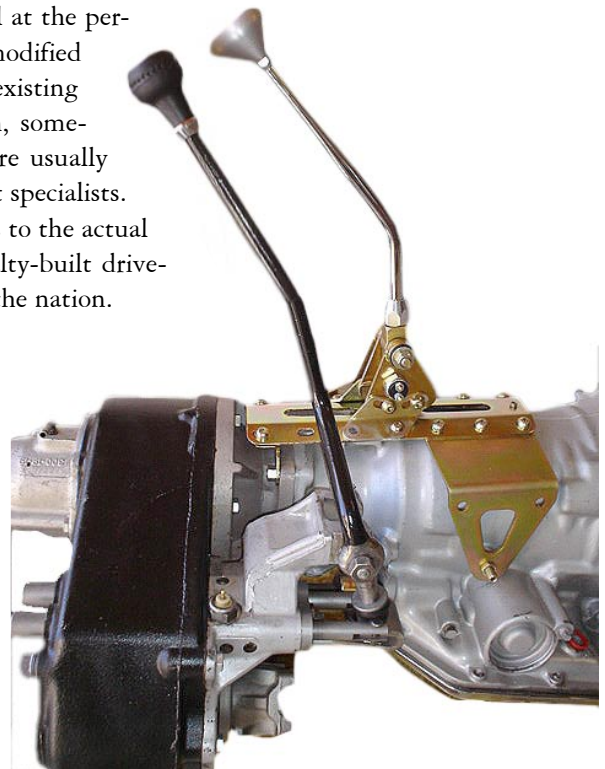
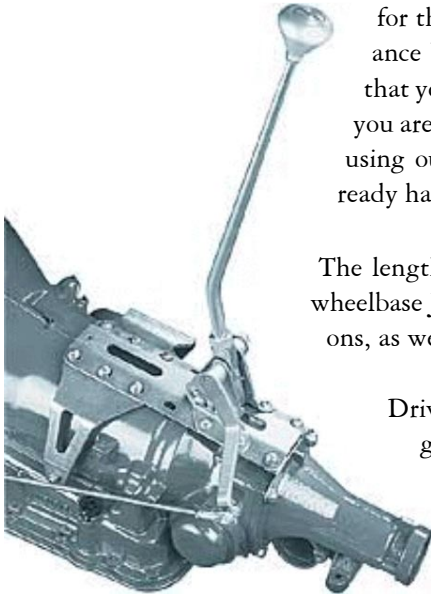
Driveshafts

Use of the factory diameter driveshaft and yoke is recommended - especially for the front driveshaft. Our adapter design has maximized clearance between the transmission pan and yoke, but it is necessary that you install your GM engine offset 1-1/4" to the driver's side. If you are installing against a factory AMC engine with a GM TH700 using our #437-AMC adapter kit, your factory engine should already have this proper offset.

The length of the Hydramatic 700 makes its placement into an 80" wheelbase Jeep (CJ5) impossible, but it is an excellent fit into CJ7s, Utility Series Trucks and Wagons, as well as all of the Full Size Jeeps.

Driveshaft length changes are often required, as this geartrain combination is typically longer than factory Jeep combinations. However, some GM engine installations will allow for the transfer case to remain in its OEM location.

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.





Transmission Rear Mount

This transfer case adapter's design is based on Novak's Universal Series adapters that feature a modular mounting and support system. Novak adapters are not just adaptation components, but strong structural components of the vehicle's powertrain. As such, they are often the best place to support the important rear mount unit.

Included with our adapter kit is a steel base which is a highly configurable mounting foot, and it is ready to accept our industry standard urethane isolator mount. This is our preferred rear mount unit. Our #135 adapters are designed for it, and its usage is essential to protect powertrain components

from the flex and jar typical of any automobile, but especially Jeeps. The urethane isolator may be mounted in either up or down orientations to best suit your particular crossmember / skidpan situation.

Some factory transmission mounts featured a torque-arm isolator with an offset, ostensibly to cut down on the kick-back from drivetrain twist. This stronger, centered style rear mount is typically just as effective when used in conjunction with good engine mounts, which have the largest effect on capturing rotation. If your exhaust used a hanger off this point, you or your exhaust professional will need to fabricate a suitable hanger, which can be anchored to this rear mount assembly if needed.

Vertical spacing using spacers or washers may be required to achieve the ~ 4 deg. of downward powertrain tilt recommended. Consider this and

A Warning on Hard Mounting

Under no circumstance should you "hard-mount" any part of your powertrain and doing so will void any warranty offered on this kit. Hard-mounting involves mounting the engine or transmission solidly to the frame horns, or to the crossmember / skidplate. This rigidity may be permissible in a race car that only sees smooth track, but is in no way appropriate for a regular street vehicle, let alone a 4wd vehicle. The powertrain requires the give, flex and shock-absorption afforded it by urethane, rubber or similar isolators.

As concerns the rear mount: even if you install a crossmember that is itself mounted to the frame on flexible isolators (also not a good idea as the crossmember is intended to be a structural and solid component of the frame), this is not enough since the amount of moment force required to flex that kind of crossmember is significantly higher and will unnecessarily strain the transmission case, rear mount base and the adapter. This can cause cracked cases, chronically loosening bolts, excessive driveline shock, broken parts, etc.

Transmission Cooling



This Jeep featured a hard-mounted adapter, though with isolators at each end of the transmission support crossmember, which offers inferior powertrain flex and unacceptable frame flex. To counteract the latter, the installer welded a tubular crossmember behind the transfer case, which makes future servicing highly problematic.

Best stick with a more conventional skidpan and rear mount isolator, which offers better characteristics, geartrain shielding and frame strength.



For every 10 degrees cooler you can keep the transmission, you can add 25,000 miles to its service life. Therefore, use of a transmission oil cooler is advisable for this automatic transmission. Use of a transmission temperature gauge is also a good idea. These are widely available and generally inexpensive.

With the increase in popularity of the newer, hotter burning, fuel-injected engines, it is increasingly recommended to run a stand-alone, dedicated transmission fluid cooler and in front of the engine radiator wherever possible, in lieu of one integrated into a radiator.

Engines & Engine Mounting

A 700R4 installation is often done in conjunction with an engine conversion into the Jeep. These engines include the Chevrolet Small Block V6 & V8, from Generations I, II, & III, 1955-2012+.

Novak's MM Series engine mounts, featuring excellent vibration dampening, superior strength and impressive adjustability - adjustable even after the engine is installed. The design and strength and affordability of our mounts are second to none.

In any scenario, it is critical that the engine be installed (as the Jeep engines usually are) with an offset of 1" to 1-1/2" to the driver's side. Other engine mounts on the market - especially the bolt-in versions - do not take this into account and make other placement decisions for the installer that do not take the full powertrain into account. Novak offers what we have found to be the most intelligent engine mounting system for Jeeps available, allowing the installer to make an easy and satisfying decision as to powertrain placement with the 700R and the Dana 300 both considered.



Axles

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

Speedometer

Because you're retaining the factory Jeep transfer case, you'll use its speedometer output to the factory (or aftermarket) gauges just as original. If you are running a cable driven gauge and a computer controlled engine that requires a VSS, you may need to run a signal generator with both cable and electrical outputs and as appropriate for your particular engine's PCM.

Conclusion

We suggest that you keep these instructions for future reference. For questions concerning your conversion, contact us. We'll be pleased to answer your questions.

There is no final word to our instruction packages. If you have a question you feel this information should have covered and didn't, please let us know about it. You are also welcome to submit your suggestions, ideas and images that you think we should include here which may help future conversion installers. Note our contact information below.

Part No.	Description	Qty.
BIL-135_137	Adapter, 135 & 137, joining the TH350 & TH700R4 to Jeep Dana 300 & early NP transfer cases, billet	1
92865A628	Bolt, 3/8-16 x 1-1/2, hex head, grade 5, zinc plated	2
92865A630	Bolt, 3/8-16 x 1-3/4, hex head, grade 5, zinc plated	3
92865A632	Bolt, 3/8-16 x 2, hex head, grade 5, zinc plated	1
F-UB3	Bracket, mount, transmission rear, automatic transmissions to Jeeps	1
7347-HP132	Gasket, six bolt front face transfer cases	1
95462A031	Nut, 3/8-16, hex, grade 5, zinc plated	2
90591A171	Nut, hex, M10 x 1.5 pitch	4
1358899	O-ring, TH350 & TH700R4 tailhousing	1
471869	Seal, oil, Dana 300 and New Process input shafts and Novak Universal series adapters	1
AS-137	Shaft, input, Dana 300 transfer case, 27 spline, standard length version	1
90435A142	Stud, 10mm x 1.5mm x 50mm long, class 4.6, full thread, steel	4
95475A630	Stud, 3/8-16 x 1-3/4, fully threaded, zinc plated steel	2
91458A114	Threadlocker, Loctite 243 blue, .5 ml capsule, oil resistant, 10 min. cure	1
91102A031	Washer, lock, split, 3/8, zinc plated	8
91202A242	Washer, lock, split, M10, zinc plated	4



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