

Introduction

This guide will assist the installer in adapting the GM TH400 automatic transmission to the Jeep Dana Model 300 transfer case as found in 1980-1986 CJ 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.

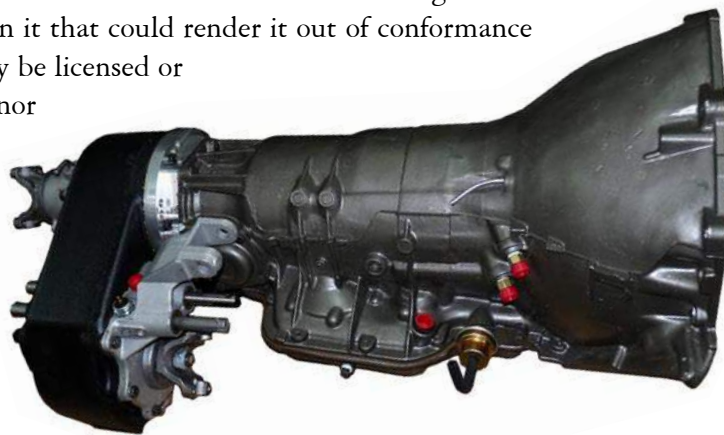
Your Legal Requirements



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 recommend 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





Advanced computer modeling methods were integral to the design of our #134 adapter assembly. We were able to push the bounds of product and process well beyond the status quo.

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 This Conversion

Our TH400 to Dana 300 conversion makes for an absolutely 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 kit is also designed for compatibility with the Jeep NP208, 219 & 229 transfer cases as found in Full Size Jeeps, 1980-1991.

The Adapter

The Novak TH400 to Jeep Model 300 / NP transfer cases adapter is very compact at only 1.4" in length. This adapter assembly is the shortest Turbo 400 adapter in the industry, providing a combined transmission and adapter length of only 25.9" (equivalent to a 18.9" manual transmission / bellhousing combination).

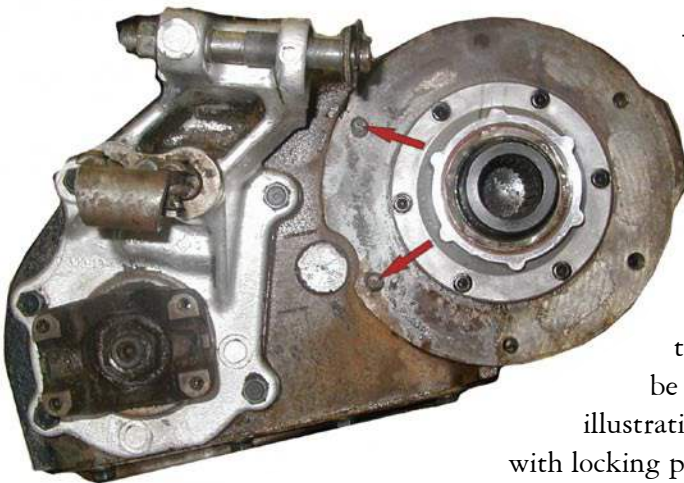
The adapter itself is machined from a billet of high-grade aluminum alloy, featuring thick flanges and a heavy cross-section.

TH400 Versions

These kits are for all years and versions of the popular HydraMatic 400, including Chevy, Buick and other GM, AMC Jeep, etc. and work with 2wd & 4wd versions.

Transmission Output Shaft

Every #134 kit comes with a new output shaft for the TH400, whether for 2wd or 4wd transmissions. 2wd versions work equally well as 4wd versions. The Novak output shaft is of an alloy steel, precision splined and hardened for a superior interchange. This shaft connects the TH400 output direct to the existing 23 spline Dana 300 input shaft for the strongest combination. Installation requires disassembly of the transmission main assembly, which is out of the scope of this guide and we recommend the services of a transmission professional. The basic installation is ~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.



Transfer Case Input Shaft

The included Turbo 400 output shaft splines in directly into the factory 23 spline Jeep Dana 300 input shaft, and transfer case disassembly is not required.

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

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. 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 TH400 / Dana 300 combo, it may be a good idea to use thread inserts in the six 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 TH400 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.

Spline Shaft Test Fitment

Before the assembling your TH400, test fit the supplied Novak output shaft into the Dana 300 input shaft. The splines should slide together easily and have a discernible amount

of rotational allowance. Note that these are involute splines and are self-centering upon transmission of power. If the fit is too loose and sloppy, it may be possible that excessive input spline wear has occurred.



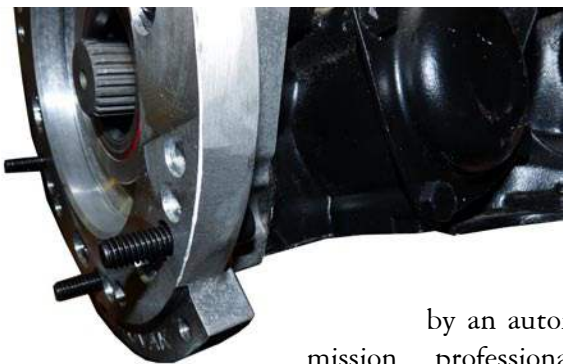
We've provided a vial of Permatex® Loctite Blue 243 thread locking compound. A drop or two per bolt is recommended to prevent the bolts from loosening under strenuous service.



Two of our preferred gasket sealants include Permatex® The Right Stuff RTV silicone and Permatex® Aviation Form-A-Gasket in the brush-top bottle. Years of experience building many hundreds of gearboxes, leak-down testing them and hard operation prove them to be superior.



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 as we are likely to have both new and good used Dana input shafts available.

Transmission Preparation

The new output shaft supplied with your kit will need to be installed in the transmission before final assembly. This is usually best done

by an automatic transmission professional, though several of our customers have the tools, skills, and documentation to do a successful shaft change-out. Whatever your method, this is usually a good time to check the clutches, bands, seals gaskets and filter and replace and rebuild if necessary.

Recommended reading for a do-it-yourselfer wishing to learn more about the TH400 is Ron Sessions book titled "How to Work With and Modify the Turbo Hydra-Matic 400 Transmission", published by MBI, ISBN 0-87938-267-8.

A step-by-step video rebuild guide to consider is by Technical Video at www.technicalvideos.com.



Adapter Fasteners

The fasteners for this adapter assembly have been provided. The adapter to transmission fasteners consist of six socket head bolts, 3/8-16 x 1-3/4" long. The adapter to transfer case fasteners consist of six socket head bolts, 3/8-16 x 1-1/4" long.

Because of this adapter's short length, it is necessary to insert the 5 o'clock (as looking from the rear face of the adapter) transfer case socket head bolt, as shown prior to mounting the adapter to the transmission.



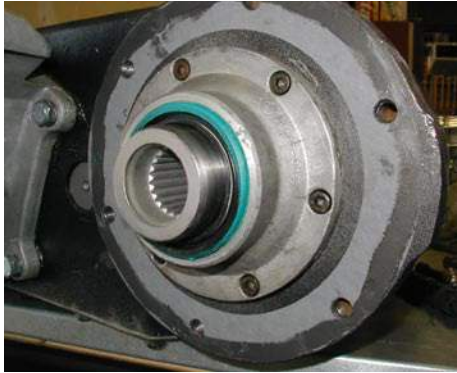
Adapter Installation

Your adapter has been pre-assembled at our facility with its internal oil seal.



You will notice that the provided transmission output flange gasket will only fit properly one way. Put a thin coat of gasket sealant on each side of this gasket and install the transmission rear gasket around the adapter's locating shoulder, making sure it lays flat.





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.

Fit the adapter to the transmission flange and thread in the bolts until finger tight. Use your socket key or wrench to tighten the bolts in a crossing pattern in three successive stages until you've achieved 38 ft. lbs. of torque.



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 TH400, the splines will then be continuously exposed to

ATF and well lubricated.

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.

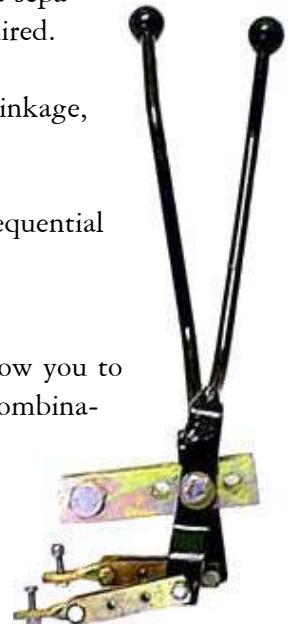
rate clocking ring - and the associated additional expense and geartrain length - is required.

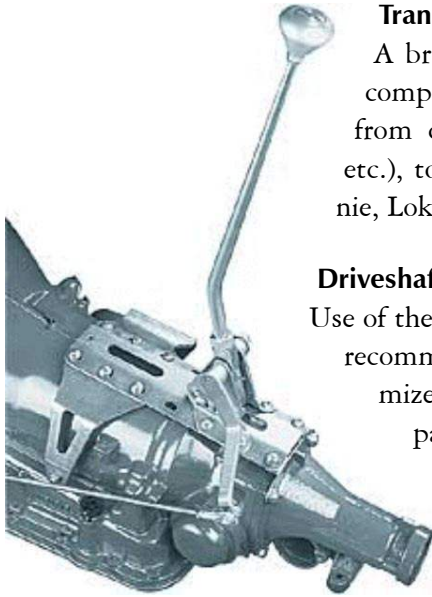
Install the adapter clocked to your preferences. Consider ground clearance, its shifter linkage, tunnel clearance, driveshaft clearance, etc.

Tighten the six transfer case bolts evenly by hand and then follow up with an even and sequential cross-tightening of the six transfer case bolts to a final torque of 38 ft. lbs.

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.; Genie, Lokar, etc.).

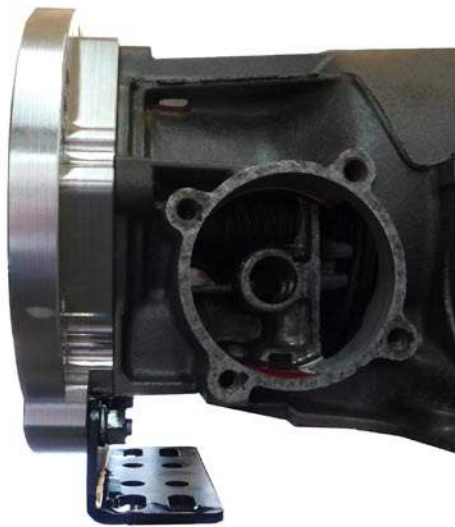
Driveshafts

Use of the factory diameter driveshaft and yoke is recommended. 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 an AMC TH400 or a GM TH400 using our #437-AMC adapter kit, your

factory engine should already have this proper offset.

The length of the Hydramatic 400 makes its placement into an 80" wheelbase Jeep (CJ5) prohibitive, but 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 #134 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

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.



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.



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 TH400 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, 1955-20012+.

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 TH400 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 after-market) 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.



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.

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-141	Adapter, billet, 134 & 141, TH400 transmission to the Jeep Dana 300 & NP transfer cases	1
OS-141	Shaft, output, TH400 transmission to Dana & NP transfer cases, 23 spline	1
3922	Gasket, TH400 rear face	1
8623943	Bushing, output shaft, TH400. Wide version, 1964-1974	1
BT-SHS-38-16x1.750	Bolt, 3/8-16 x 1-3/4, hex socket, standard head	6
BT-SHS-38-16x1.250	Bolt, 3/8-16 x 1-1/4, hex socket, standard head	6
7347-HP132	Gasket, six bolt front face transfer cases	1
471869	Seal, oil, Dana 300 and New Process input shafts and Novak Universal series adapters	1
F-UB3	Bracket, mount, transmission rear, automatic transmissions to Jeeps	1
NT-HEX-38-16x0.328-G5Z	Nut, 3/8-16, hex, grade 5, zinc plated	2
WA-SL-38	Washer, lock, split, 3/8, zinc plated	2
SD-38-16x1.750-Z	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



©Novak, Inc.
www.novak-adapt.com
support@novak-adapt.com
877.602.1500

