

Introduction

We hope that your engine to transmission conversion goes very well, and that the installation of your Novak adapter works as smoothly as it is designed to. This kit is for adapting most AMC standard shift bellhousings from 1976-1986 to the Aisin Warner AX15 five-speed transmission as found in 1988-1999 Jeeps, and the NV3550 as found in 2000-2004 Jeeps.

Despite your experience with automotive work, we strongly advise you to read these instructions, in which are contained the requirements, tips, hints and tricks of performing these conversions, both in our own facility and information we've gained from discussing this upgrade with our customers. Put this information to good use. Failure to implement the practices and information in these pages may jeopardize the quality of your work, as well as the product warranty.

Note to the Installer

This document and the use of any Novak products assumes a safe and adequate working knowledge of the automotive systems involved. We do not know and there is no way for Novak to determine the skill level of the customer and/or the installer of Novak products, or for Novak to publish all of the foundational information that an individual should know before attempting these advanced automotive upgrade procedures. Vehicular 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.

Novak products and procedures are intended and recommended for off-road use only.

Additional Instructions

This instruction set is intended to be used in conjunction with The Novak Guide to Clutches, Linkages & Bellhousings, found on the Novak website at: http://www.novak-adapt.com/knowledge/clutches_etc.htm . This document is invaluable and is the greatest compilation of clutch set-up and troubleshooting knowledge available.

Adaptation

Preparation

Transmission removal is facilitated by removal of the shifter assembly from the transmission. This shifter assembly is held down by two bolts and two studs, and can be accessed through the shifter hole in the floor, or from under the Jeep with the cross member removed and the drivetrain lowered.

Remove the 4.0L bellhousing from the transmission from within the bellhousing after the 4.0 engine has been pulled. We do recommend a good wash-ing of the transmission. It is particularly vital that the front face be clean so that nothing can present a risk of the bellhousing/adapter assembly being installed unparallel.

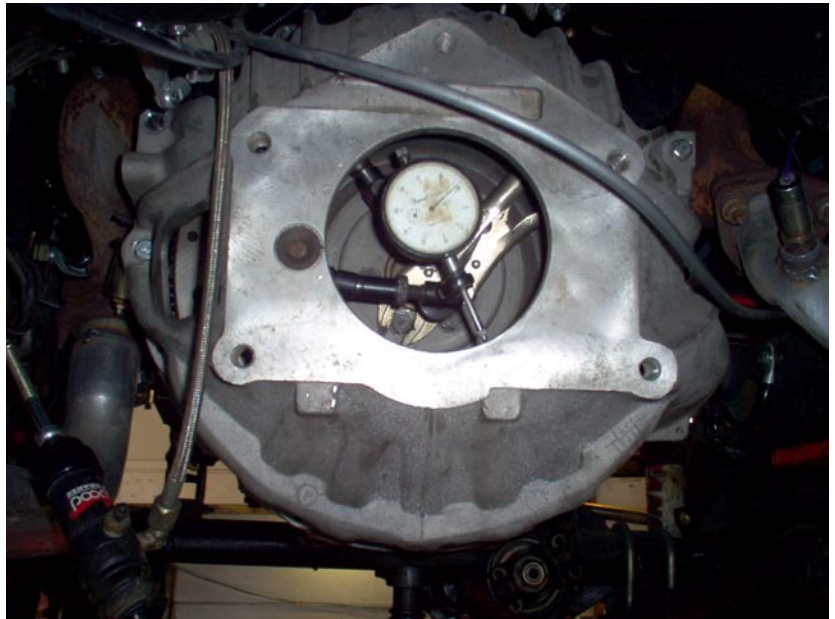
A Novak input bearing retainer is provided with each adapter kit, which is made so that you can use any of the common Ford style throwout bearings, or the Novak TB2 adjustable throwout bearing.

There are two styles of bearing retainer for the AX15. Models up through 1993 did not use a throw out bearing sleeve since they were made for use with the (notoriously problematic) internal hydraulic release bearing. The 1994 and later AX15 versions did use a throw out bearing sleeve. Our AMAX adapter and provided input bearing retainer will replace both versions of the AX15 factory input bearing retainer.



Bellhousing Alignment

On any engine using a standard shift transmission, with or without an adapter, it is important to check the bellhousing locating bore location relative to the crankshaft. The potential for transmission failure or premature wear is so great, due to misalignment at this point, that no engine should be assembled without being checked. The checking procedure is quite simple. Correcting misalignment is not so simple but must be done to insure normal service from the transmission. A dial indicator is required, as well as a suitable means to mount this instrument on the engine crankshaft.



A dial indicator (right) is a device that has an arm or contact point, suitably connected to a pointer, that moves in front of a dial with markings on its face. These markings usually represent .001" each. The purpose of a dial indicator is to measure in thousandths of an inch that can be read directly on the dial of the indicator.

To check a bellhousing, mount it on the engine it's going to be used with, make sure there are no burrs or dirt on the block or bellhousing. All bellhousing to block bolts should be in and tight. Mount the dial indicator on the crankshaft of the engine using a suitable magnetic base attachment or mechanical clamping means. The contact point of the indicator should be touching the bore of the bellhousing. The indicator must be mounted rigidly enough so it does not move on its mounting to prevent false readings. Rotate the engine by hand with the spark plugs removed and observe the reading on the dial. Keep adjusting the dial assembly until the needle moves the least amount per rotation. When you have achieved the least amount of needle movement through the 360 degree sweep of the indicator, this is your runout. You can then determine the direction it is offset by the movement of the needle.

The total number of thousandths misalignment of the bore relative to the crankshaft is read directly on the dial. Total runout should not exceed .007", with .010" being maximum. The greater the misalignment, the sooner transmission problems and failure will occur. A symptom of misalignment is unusual wear of the pilot bushing. We have checked stock Chevy bellhousing on engines that were out more than 1/32" (.032"). Anything over .010" runout must be corrected before the engine and bellhousing are put in service or you can count on pilot bushing, transmission, and clutch problems, followed by transmission failure. The simplest way to correct misalignment is to try another bellhousing or bell housings. Machining the bellhousing is the best cure but offset dowel pins are simpler. Shims between the block and bellhousing will also work if you have the patience to use this method. Offset dowel pins are available from speed shops locally or online.

Installing the Pilot Bushing

Before installing the transmission to the engine, the special pilot bushing provided must be installed in the AMC crankshaft.

A piece of broomstick makes a good drift punch to install the pilot bushing. Never hammer directly on the bushing as it is quite soft, and it will surely be damaged by such a technique. If the tolerances are tight between the crank and bushing, you may wish to set the pilot bushing in the freezer for an hour and then very lightly warm the end of the crank with a torch before assembly. This facilitates some installations and provides for a secure fit.

Adapter to Transmission Assembly

At Novak, we try to assemble all products and kits to the fullest extent that we can prior to shipping your order. For the AMAX15 kit, the only item we can truly install prior to shipping is the input shaft oil seal into the backside of the adapter plate. The seal should be installed, but should you receive your kit without this seal installed you will need to do so. Using an arbor press, or similarly save and effective means, press the oil seal into it's race in the backside of the retainer.

Next, install the input retainer to the front of the adapter and secure it with the three (3) provided 5/16"-18 flat socket head bolts (image, right). As the AX15 uses dowel pin alignment - and that this alignment is crucial to the life of your transmission - you will notice that the dowel pins will fit tight into the adapter itself. Make sure there are no nicks or burrs that would prevent it from installing easily. Slide the adapter on carefully keeping it parallel to the front face of the transmission. If the plate gets tilted, it will prevent it from sliding on. You may wish to use a soft face mallet and gently tap each side in alternate succession.

The adapter is attached to the transmission with metric socket head bolts with a unique M10x1.25 and M8x1.25 thread pitch. Do not substitute them for standard 10mm bolts, as thread damage will occur. We recommend that you torque them to 20 ft. lbs. in a 10 ft. lb. increment, and then two 5 ft. lb. increments in a crossing pattern. The design of the adapter and the goals we held for its strength precluded us from using a deeper counterbore for conventional lockwashers. Therefore a light amount of thread locking compound such as Loctite™ Blue (provided) must be used.



AMC Bellhousing Versions & Preparation There are two major styles of AMC I6 & V8 bellhousings from 1976-1986, and two minor styles from 1980-1986. They are all the same depth, engine bolt pattern and rear face bore diameter, however, their transmission rear face bolt patterns differ.

Jeep T150, T18 & T176 Bellhousings, 1976-1986

If your bellhousing was mounted to a Jeep T150 or Jeep T18 transmission (1976-1979) or a Jeep T176 transmission (1980-1986), then you will need to drill out the top two holes of the bellhousing to 15/32". The top two bolts will mount from inside the bellhousing into the threads on the adapter. The bottom two bolts go through the adapter into the threads on the bellhousing.

Jeep SR4, T4 & T5 Bellhousings, 1980-1986 All

1980-1986 Jeep bellhousings used the same casting, but somewhat different bolt patterns on the back and feature a great, broad rear face for multiple transmission possibilities.

If your bellhousing was mounted to an SR4, T4 or T5 transmission, then it will be necessary to drill four holes and tap two to mimic the T176 style version. Because the hole pattern of the AX15 in-terfere with two of the holes in this bell-housing's factory pattern, this was the only reasonable workaround. It is an easy process.



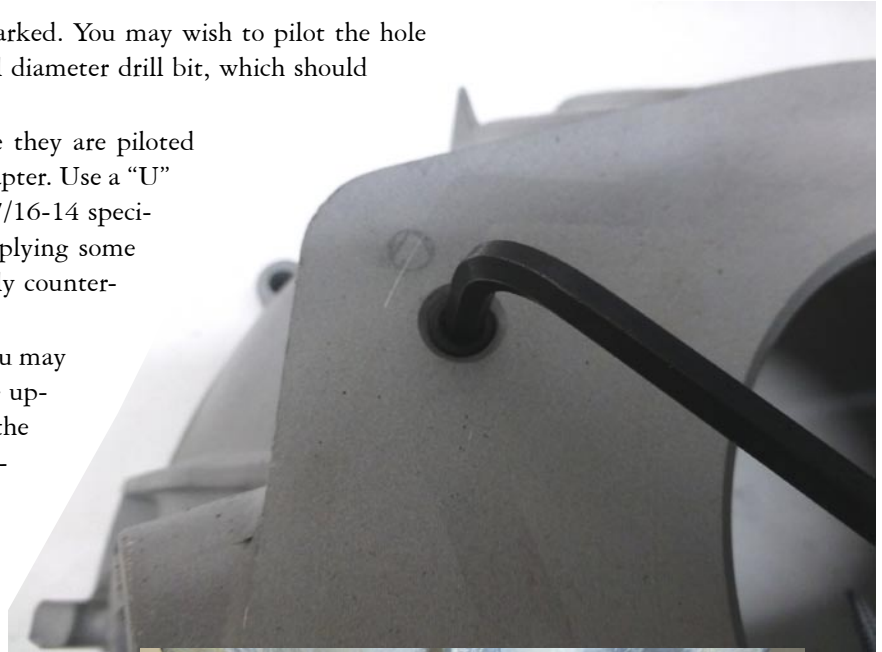
With the retainer installed onto the adapter for centering purposes, place the adapter onto the bellhousing and using a light, peer into the lower two

holes to line them up with the holes that are already factory-piloted in the bellhousing. Once you have achieved best condition between them (and note here that mass-produced, factory-drill patterns can vary some from an orthodox blueprint) use a transfer punch or pencil through the upper holes of the Novak adapter to accurately scribe the circle to be drilled. Because the retainer on the adapter provides precise location, the bolt hole locations can vary slightly and still achieve a precision centered assembly.

Center drill, then drill the upper two holes as marked. You may wish to pilot the hole with a smaller drill bit, then move up to the final diameter drill bit, which should be a 15/32" diameter drill.

The lower holes are even easier to prepare, since they are piloted from the factory for the lower bolt holes in the adapter. Use a "U" size or .368" drill, and then tap to the common 7/16-14 specification. Make sure to keep your tap straight, applying some downward pressure while tapping and occasionally counter-rotating the tap back to break the chip.

Once these upper and lower holes are prepared, you may wish to chamfer or break their edges. Because the upper two holes being drilled are in proximity to the existing factory holes, we have provided two 7-16-14 set screws to strengthen the wall of that area. Use a drop of threadlocking compound (Blue is recommended) and screw them in until they just sit below the surface of the bellhousing face.



Adapter to Bellhousing Installation

We have provided four 7/16"-14 hex-head bolts for this purpose. You may use lockwashers or a thread locking compound to lock these four bellhousing bolts. Torque them to 45 ft. lbs. in two successive and incremental steps, following a crossing pattern.



Clutch System

Install the Clutch Fork Assembly

Now install the AMC style clutch release and throwout bearing and its release fork. Make sure to install a light amount of grease on all friction points.

Clutch Release

In most Jeeps that feature these transmissions, you may want to use the factory hydraulic clutch linkage system. You have the option of using an internal (concentric) hydraulic throwout bearing, or you can use a more conventional external slave cylinder with a release arm, as we have done in the picture shown below, on the right. On this example, we used a Jeep CJ slave cylinder and a modified version of the AMC hydraulic bracket that came with the hydraulic release style bellhousing. If you have purchased the Novak Hydraulic Clutch Retrofit kit for AMC bellhousings (HCRA), included in this kit is Novak's AMC slave cylinder mounting bracket, as seen in the image.



Drivetrain Positioning

Our experience shows that the AX15 and the 231 transfer case will move forward as much as 3" with Small Block V8 conversions. This is quite advantageous to lifted Jeeps whose owners are seeking better driveshaft angles. The crossmember may be left in the original location, with the only modifications being to the transmission mount. Two holes may need to be drilled into the crossmember for relocation. On one of our TJ conversion projects, we shifted the transmission forward on its mount, using a simple bracket.

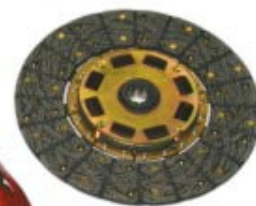
Any change in positioning may necessitate modifications to the AX15 shifter. The example (image, right) has been lengthened by welding in an extension rod and subsequently bent for the proper angle. While you are welding, make sure you remove the plastic ball bushing on the end, as well as the shifter stick. A vice and soft face mallet will facilitate the removal of the stick, as it is attached by a notched, press-fit.

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.

Our adapter is made from a billet of 6061 aluminum, heat treated to T6 condition. It is actually stronger than cast iron. In spite of this, the adapter, like anything else, is not indestructible. Misalignment, improper assembly, improper mounting, or incorrect driveshaft lengths, and miscalculated driveshaft geometry on shackle reversal setups are some of the things that may cause adapter failure. 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 workmanship.



Conveniently, the AX15 has a 1-1/8", 10 spline input shaft. Jeep clutch disks from 1980-2006 commonly have the proper disk hub to accommodate this. Use a pressure plate that is matched to your engine.

Air pollution laws vary from state to state. Changing an engine or transmission in your vehicle may change its pollution status. It is the customer's responsibility to determine that their vehicle conforms to whatever state and federal regulations that may apply to their vehicle. Neither Novak, Inc. nor its directors are responsible for any changes made to your vehicle.



- AMAX15 adapter plate
- Retainer, Novak AMAX15
- Bolts (4), 5/16"-18 x 7/8", socket head, flat
- Washers (4), 5/16", flat
- Washers (4), 5/16", split lock
- Bolts (9), M10x1.25-25mm, socket head
- Bolts (8), M8x1.25-20mm, socket head
- Seal, oil, input
- Bolts (4), 7/16"-14 x 2-1/4", head head
- Locktite™ Blue
- Instructions

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