

Introduction

We hope that your engine to transmission conversion goes very well, and that the installation of your Novak adapter works as well as it is designed to.

This kit is for adapting Chevrolet Generation I-II V6 & V8 engines and GM Generation III+ engines to AMC-flanged bellhousings and their associated transmissions. These transmissions include the NSG370, NV3550, AX15, BA10/5, T176, T5, T4, SR4, T150, T18, T15, and T14.



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 information on fundamentals that an individual should know before attempting these advanced 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.

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 Jeep and the installer should obtain use both their vehicle's manual and the engine donor vehicle's manual in conjunction with these instructions.

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

Your Local Legal Requirements

This guide is not meant to explain, interpret or notify the installer of local or national laws concerning vehicle changes, engine conversions and the emissions systems surrounding them. It is the installer's responsibility to know and understand their local legal requirements and regulations and to make their installation conform to demands of the jurisdictions in which they live. 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 or employees are responsible for any changes made to your vehicle.



We recommend you consult and know your own city, county, state or countries laws. If your vehicle requires referee inspection, you may wish to establish a rapport with a referee and discuss your plans and seek advice and approval from them.

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.

The Adapter Kit

This plate style adapter is precision laser cut and machined. Included are the adapter, fastening hardware and instruction guide. Precision CMM mapped and machined dowel locators and fastening points assure total concentricity for long transmission life. The adapter is plated in black zinc for corrosion resistance and appearance.



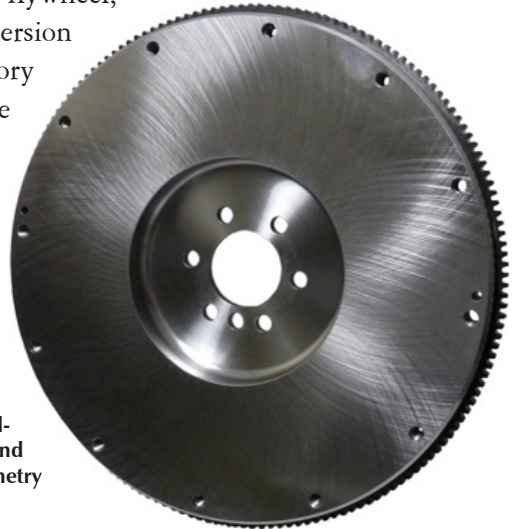
Your kit has been sent with either SAE or Metric fasteners as indicated by your order; the former for Chevrolet Small Block engines and the latter for GM Generation III+ engines.

Your Standard-Shift Assembly Bellhousing

You will use your factory AMC style bellhousing as native to the transmission to which you are adapting the GM engine.

Flywheel & Starter Chevy Small Block Engines

You will use your Chevy flywheel, which can be either the 153 tooth version or 168 tooth version. You will also use the factory starter as matched to your particular flywheel, as it bolts directly to the block of the engine. Note that some earlier Chevy Small Block starters with the larger nose cones may interfere with the AMC bellhousing's starter pocket. We recommend the smaller nose cone starters or the gear-drive starters as found on late Small Blocks, such as the 1996-1998 Vortec Gen. II V8 or similar era Vortec V6.



GM Gen III+ Engines

Because GM shortened their cranks on their Gen III+ engines, and because of the metric pattern and expensive and incompatible clutches, Novak strongly recommends the use of an aftermarket flywheel for your V8

which restores Chevy flywheel spacing without disengaging the flywheel's ring gear from the starter, and which is drilled for conventional and affordable Chevy 12" clutches. These flywheels more than make up for their cost in reduced headaches and expenses elsewhere in the project.

This is the right and recommended GM Gen. III+ flywheel to use to standardize the clutch assembly, and achieve proper clutch geometry and release action.

Clutch Disc

You will use the GM style clutch disc that comes with your chosen GM clutch kit when adapting to Jeep manual transmissions made back to 1980 and from 1975-1972 Jeep transmissions such as the T15 and T14. GM discs will match their 10 spline, 1-1/8" diameter input shafts.

If you are marrying this assembly to a 1976-1979 Jeep transmissions such as the T150 or T18, you will need to use a separate clutch disc featuring a 10 spline, 1-1/16" hub, as found on these AMC Jeep applications, or on some Ford Small Block applications from 1970-1991. Novak carries these in stock, or ask your clutch supplier if you can purchase the disc and pressure plate separately, as indicated.



Pressure Plate

Use of just about any GM pressure plate - factory style or aftermarket - will work with this conversion, so long as you have a versatile release bearing. For this we recommend our fully adjustable release bearing.

Release Bearing

Most conversions covered by this kit, whether hydraulic release or mechanical release, use a conventional release bearing, excepting the Peugeot BA10/5 and the early AX15's which used an internal concentric hydraulic release bearing. If working with these specific models, jump to Clutch Linkage, below.



For conventional release bearings, getting the airgap down to $\sim 1/8$ " between the clutch fingers and the release bearing is critical to proper operation. Factory Jeep release bearings have few choices in length and configuration, and some versions have even been discontinued. We have learned through experience that the very best way around this problem is to use Novak's fully adjustable release bearing, which was designed for this conversion. Instructions specific for its installation are included with its purchase.



Clutch Linkage

This conversion spans Jeep transmissions from 1972-2006 and three major linkage systems: mechanical, internal hydraulic and external hydraulic. Because Chevy pressure plates have more holding power, they require about $1/2$ " of travel at the fingers to release the pressure plate, and Jeep pressure plates require $3/8$ " of travel at the fingers to release the pressure plate, some changes to the linkage system to increase travel by $\sim 30\%$ may be required. This is not a small difference in clutch terms.

Mechanical Linkage

We recommend the retention of the original AMC / Jeep release arm as factory-installed on most 1972-1986 Jeeps. However, it may be required to lengthen the travel of the clutch release arm push rod by up to 30% by increasing the height of the final bellcrank by that amount. Because this is an external change, we recommend you try it with no modifications. If the clutch releases objectionably low in the pedal's travel, or doesn't release at all, then modification of the bellcrank as above may be required via fabrication and welding.

Internal Hydraulic Linkage

These 1987-1992 era systems are not exactly the favorite of Jeep aficionados, but they are adequate and if maintained, can do their job well enough. Because they are self-adjusting, they have a little more travel available to them. To achieve greater distance, substituting a master cylinder with a larger bore is recommended. Luckily, a Jeep CJ master cylinder has about a $7/8$ " bore vs. the Wrangler / XJ master cylinder bore of $\sim 3/4$ ".

As such, we recommend that a master cylinder #5359822 as was factory on some 1980-1986 CJ Jeeps. As with any release bearing, make sure that the starting point of the bearing's travel is as close to the diaphragm fingers as possible in the fully compressed state as possible, so that its full contingent of travel is available to release the Chevy clutch.



External Hydraulic Linkage

These improved release systems from 1993- are the de-facto standard and very successful in Jeeps. For these, we recommend that the installer replace the factory 7/8" slave cylinder with Novak's 3/4" billet aluminum slave cylinder assembly. The Novak cylinder features an extended travel distance which provides a better clutch release action.



Conversion Procedure

NSG370, NV3550 & AX15 Bellhousing Preparation

This step applies only to the above transmissions.

The bellhousing flange of the 1987-2006 transmissions features two undrilled holes at about 10 o'clock and 2 o'clock that we recommend the customer drill for maximum attachment strength



to the GM engine. We recommend you use the Novak adapter plate as a drill template to make this job easier and more accurate. Bolt the plate to the front face of the bellhousing and use the offset dowel pins to center the plate precisely to the bellhousing.

Use a 13/32" drill and drill through as shown. You can then proceed as normally indicated below.

Preparation

Make sure your engine block rear mounting face is clean and free of debris. Blow out and clean your engine block threads with solvent and make sure the threads are in good condition.

Your Pilot Bushing

Depending on the transmission you have and the engine you choose, your new pilot bushing will vary. Remove your factory pilot bushing from your engine's crank.

Some individuals wish to soak the bushing in a light mineral oil (motor oil, etc.) for a day or two before installation. This is fine, but the porous bronze is already impregnated with lubricant adequate for many years of great service.

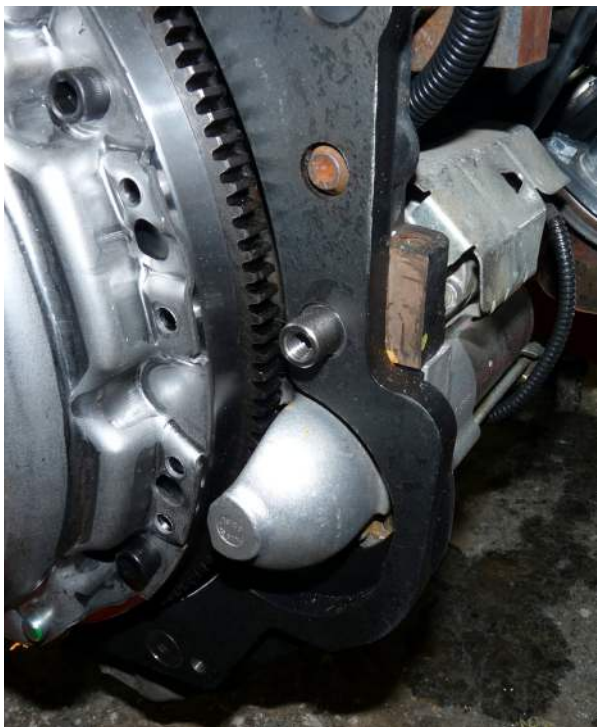
To install the bushing into the crank bore, we recommend freezing it long enough to shrink it as much as possible. We also recommend lightly warming your crank flange just prior to installation. Use a drift, socket or any appropriate driver and drive it squarely into place.

Offset Locating Dowels

Two of the AMC and Chevy bolt holes actually interfere with each other. This presented us with a unique design challenge and in response, this Novak kit uses innovative offset dowel fasteners that provide a critical centering function for the Jeep bellhousing to the adapter plate, as well as a fastening function to help get maximum assembly strength.

Thread these provided offset dowel fasteners into the GM block at about the 3 o'clock and 9 o'clock positions. Take these dowels to their final thread but do not fully tighten them as they require several degrees of rotation for adapter installation to occur.





Fit the Novak adapter plate against the engine block to achieve your orientation with it. As you gently slide it into location, tweak the special dowels and plate together until they align themselves with their corresponding holes in the adapter plate. Work the plate gently up against the block face while aligning it to the GM dowel pins on the block. Seat it into place with a soft mallet and the plate will now hold itself in place.

GM Engine Dowel Pins

It is critical that your GM dowel pins do not protrude past the adapter plate rear face, else it will hold the bellhousing off from being square. These dowels may need to be driven frontwards with a mallet and soft drift, or be ground down somewhat to ensure a flush installation with the adapter plate. They must not protrude past 0.450"

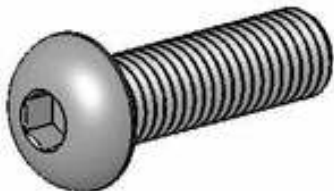
Plate Installation

When you're content with the fit, thread in the provided countersunk socket head bolts through their corresponding holes in the adapter and into the engine block. Use a drop of Loctite 242 Blue ("serviceable") thread locking compound. Note the presence of two countersunk locations that correspond with the holes in a Gen. III+ oil pan. You will leave these holes open on engines without this feature.



Do not fully tighten any one bolt yet. Evenly and sequentially tighten up all the bolts on the adapter to the block, going from bolt to bolt in a crossing fashion. Finally torque to 30 ft. lbs.

Note that on GM Gen. III+ V8's, one bolt in the cam cover may interfere with the adapter plate. For this, we have provided a new M10, button head cap bolt with which to replace the interfering factory bolt. Torque to ~15 ft. lbs.





Flywheel & Clutch Installation

Install your flywheel and clutch assembly as per GM norms and according to the installation procedures outlined by your clutch manufacturer's instructions.

Bellhousing Fastening Hardware

Thread the provided studs into the adapter plate and corresponding offset dowels, again using a drop of thread locking compound. Take the studs to their full thread depth by hand.

Bellhousing & Transmission Installation

You can now install your bellhousing, if it is not integrated to your transmission.

Clutch Release

Now, install your clutch release system as discussed earlier, above.



Drivetrain Positioning

In a Jeep TJ, this kit pushes forward the drivetrain by $\sim 2\text{-}1/4"$. It may be possible to move back the transmission mount $2\text{-}1/4"$ on the transmission to get it to line it up against with the crossmember.

Any change in positioning may necessitate modifications to the transmission shifter. The example, below, has been lengthened by welding in an extension rod and subsequently bent for the proper angle. 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.



It may be necessary to slightly clear the rim of your bellhousing pocket to clear the starter casting. Pay close attention when you're test fitting these parts to identify this possible requirement.

Never use a grinding wheel to remove aluminum as the wheel can load and explode. Use only a hand or rotary burr or file designed for removing aluminum.

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 engine upgrade.

Conclusion

We strongly 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.



375-1 Kit Part No.	Description	Qty.
F-P375	Adapter, plate, 375, adapting Chevy engine blocks to the AMC I6 & V8 flanged manual and auto transmissions	1
375-38	Dowel, offset locating, Gen. I-II Chevrolet engines to AMC flanged bellhousings, 3/8" threads	2
BT-SHF-38-16x1.000	Bolt, 3/8-16 x 1, hex socket, flat head, black finish	6
SD-38-16x2.250	Stud, 3/8-16 x 2-1/4, fully threaded, plain steel	2
NT-HEX-38-16x0.328-G5Z	Nut, 3/8-16, hex, grade 5, zinc plated	2
WA-F-38x0.750x0.090-Z	Washer, flat, 3/8 x 3/4 x .090 thick, zinc plated	8
WA-SL-38	Washer, lock, split, 3/8, zinc plated	8
BT-SHS-38-16x1.750	Bolt, 3/8-16 x 1-3/4, hex socket, standard head	6
NT-38x24x3	Nut, hex, 3/8-24, domed, adjustable, HCR pushrod	1
PR-38x24x3	Pushrod, threaded, 3/8-24, hydraulic release	1
NT-HEX-38-24x0.225-G5Z	Nut, 3/8-24, hex, grade 5, zinc plated, jam	1

Kit 375-3 Part No.	Description	Qty.
375-10	Dowel, offset locating, Gen. III GM engines to AMC flanged bellhousings, 10mm threads	2
BT-SHS-M10x1.50x30	Bolt, M10 x 1.50 pitch x 30mm, hex socket, standard head	7
SD-38-16x2.000-P	Stud, 3/8-16 x 2" x 0.750" partially threaded equal length ends, black oxide	5
NT-HEX-38-16x0.328-G5Z	Nut, 3/8-16, hex, grade 5, zinc plated	5
WA-F-38x0.750x0.090-Z	Washer, flat, 3/8 x 3/4 x .090 thick, zinc plated	5
BT-SHB-M10x1.50x25	Bolt, M10 x 1.50 pitch x 25mm, hex socket, button head, black finish	1

Kit 375-1 (Chevy Small Block) and Kit 375-3 (GM Gen III+) are similar, with differences for the latter kit listed in the lower table.

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