

INSTRUCTIONS FOR NOVAK KIT #423

Adapting the SM420 to the Model 300 Transfer Case



We hope your transmission to transfer case conversion goes very smoothly, and that the installation of your Novak adapter works as well as it is designed to. This kit is for adapting the Muncie SM420 truck four speed to Jeep® Dana Model 300 transfer case.

Despite whatever your experience with this type of work may be, we strongly advise you to read these instructions well and save them for future reference and parts numbers. We have found that even the most experienced swappers can use a review.

Preparing the Transmission

The correct transmission output shaft will have a 10 tooth splined shaft that is 1-3/8" in diameter. This can be a two or four-wheel-drive transmission.

The Muncie 420 can be used with any GM engine having a 4-11/16" bellhousing bore and the "regular" GM transmission bolt pattern. However, this transmission works best with the open bottom Chevrolet bell housings because the lower holes in the transmission case are threaded rather than drilled for clearance. The threaded hole case cannot be modified, so the lower attaching bolts must be installed from inside the bellhousing. This is inconvenient on full circle (one piece) bell housings such as Buick V6 and 1962 and newer Chevrolet V8. The lower bellhousing holes must be drilled for bolt clearance (17/32" drill) and the clutch release arm, bearing, and bellhousing must be assembled to the transmission and then assembled as a unit to the engine. This requires that the clutch disc be perfectly aligned with the pilot bushing and that sufficient clearance exists behind the engine to install the assembly.

Transmission disassembly is not required to use this kit. Remove the retaining bolt and rear drive shaft yoke (if so equipped). Remove the rear bearing cover (extension housing) and scrape the rear gasket surface of the transmission. Note that early versions of the 420 Muncie transmission had a thrust plate bolted to the end of the cluster shaft by two hex head bolts. This should not be removed, as it secures the bearing to the shaft. Your adapter has been machined for proper clearance.

Some SM420's have a snap ring that secures the output shaft to the rear bearing, and others do not. If the transmission being used has a snap ring on the output shaft at the rear bearing, leave it in position and note that you will *not* use the supplied safety clamp ring during installation.

Preparing the Transfer Case & Installing the Transfer Case Input Shaft

Because this kit replaces the input shaft of the Model 300 transfer case, removal and disassembly of the aluminum retainer assembly is required. Remove the two studs from the mounting face of the transfer case. Some transfer cases use six bolts instead of studs. If so, remove the six socket head bolts from the transfer case input bearing cap using a 3/16" hex (Allen) wrench. Carefully pry the front bearing cap assembly from the transfer case. 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 snap ring and gear. Remove the large retaining ring that holds the bearing in the casting and remove the shaft with bearing. Press the bearing off the shaft. If the input bearing or seal in the Model 300 retainer is to be replaced, now is the time. Press the bearing on the new input shaft then lube the seal and shaft, reinstall the new shaft and bearing assembly and bearing retaining ring. Put a thin coat of molybdenum disulfide grease (black grease) on the splines of the input shaft that engage the transfer case input gear splines. Also, on the oil seal that is installed in the adapter, apply a layer of oil or grease along with the transfer case input gear hub that rides in this seal.

Prepare the transfer case for assembly to the adapter by cleaning the transfer case surface with sandpaper and a small block of wood. Sand the mounting face of the transfer case until it is absolutely clean of dirt and rust. This step is important to insure a proper seal between the adapter and transfer case. The Jeep factory adapter did not use a seal at this location and the mounting face of the transfer case may have accumulated a considerable amount of rust and dirt. Reinstall the two studs in the transfer case (if so equipped).

If the bearing or seal in the retainer is to be replaced, now is the time. Press the bearing on the new input shaft, lube the seal and shaft, reinstall the shaft and bearing assembly and bearing retaining ring. Install the gear and snap ring.

This adapter is made from 356 aluminum, heat treated to T6 condition. It is actually stronger than cast iron. In spite of this, the adapter, like any other material, it 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 design or workmanship.

Assembly and Installation

The adapter will replace the original Muncie extension housing with the following notations: First, lube the seal and shaft before installing adapter. This adapter is designed to be used with a 1/64 to 1/32" thick gasket between the transmission and adapter. If you use a gasket thicker than this, you may have excessive end play on the mainshaft and problems with the transmission staying in 4th gear. Put a thin coat of gasket sealer on the rear of the transmission and the face of the adapter. Install the aforementioned gasket (supplied) on the rear of the transmission case.

Next, screw the coarse threaded ends of the five studs (supplied with the kit) into the five upper holes in the rear of the transmission case. These are the five holes in the adapter, into which you obviously cannot put bolts. Install the adapter far enough onto the studs to start the five nuts on the studs. The studs supplied with this kit are oversized on one threaded end. This oversized end is marked with red and this red end should be installed in the adapter casting. The studs can be screwed into the casting without damaging them by "locking" two nuts together on a stud and wrenching on the nuts rather than using Vise Grip pliers or similar tools that damage and weaken the stud.

With the adapter in place, tighten the nuts while working the adapter up to the face of the transmission. Install three of the original rear cap bolts in the remaining holes. Tighten all bolts and nuts to 30 to 35 foot pounds. It is a wise idea to cross tighten the bolts and in three successive steps until all are tight.

Final Assembly

If there was no snap ring on the transmission output shaft at the rear bearing then put the safety clamp ring on the transmission output shaft until it stops against the rear bearing. Tighten the clamp ring screw in the locking to 25 foot pounds. *Do not (!) use both the snap ring and the safety clamp ring. Use one or the other, but never both.*

At this point, the large O-ring goes in the groove in the face of the adapter to prevent leakage of gear lube. *Do not* use RTV sealant in the O-ring groove. RTV, like hydraulic fluid, will not compress and you would risk causing the adapter casting to break when the bolts are tightened. Assemble the transfer case to the adapter using the original bolts. Sequentially cross tighten these bolts in stages.

Mounting the Drivetrain/Geartrain Assembly

The adapter is drilled to use the rear mount from the Muncie truck 4 speed. This is Borg Warner part #31-2268. The rear mount from the 1980-86 CJ could also be used by filing the bolt holes in the mount to the 3-3/4" dimension of the Chevrolet mount. Do not modify the adapter.

Most installations in 1980-86 CJ's will require an approximate 2" thick spacer between the rear mount and the skid plate. This spacer and a new rear mount are available from us as our Kit #RM-465. Some applications may require that new holes be drilled for the rear mount location to maintain the 1-1/4" offset of the original transmission/engine combination. Also, the skid plate may have to be notched at the front edge for clearance at the transmission case, as it hangs down lower than the original. We advise the use of a flush head drain plug to minimize the size of the notch.

Driveshaft and Engine Concerns to Consider

Because this transmission-adapter combination is shorter than the Jeep SR4, T4 and T5 transmissions, the rear driveshaft will have to be lengthened and the front driveshaft shortened when using this kit. This is of advantage to those with concerns about drive line lengths and angles. Finish mounting the transmission and engine and have the weight of the Jeep on the wheels when measuring the length to modify the drive shafts. Our experience has shown that many stock Jeep drive shafts are not quite the correct length from the factory. This can be corrected when the drive shafts are modified.

Any changes in driveshaft length changes must be determined after the engine and transmission have been mounted. The Jeep must be sitting on the ground with its full weight on the wheels to make the best determination. If a shackle reversal has been or will be performed on the Jeep, it is crucial that you calculate the suspension geometry's effects on the front driveshaft. Shafts

that are too long or do not have enough play will cause the driveshaft to ram your transfer case, causing damage to your axle, driveshaft, transfer case, adapter or transmission.

Transmission and Transfer Case Linkages

Before installing the transfer case shift lever, modify the mounting shaft by sawing or grinding the end closest to the transmission (the end where the pre-load washers and retaining pin go) so there is only about 1/32 to 1/16 of an inch beyond the retainer pin hole. This will insure the shaft clears the transmission case.

The Jeep floorboard piece can be modified to clear the transmission top cover. A Hurst® (part #114-7494) or Spark-O-Matic® large boot works very well for this application. (Spark-O-Matic is an import copy of the Hurst boot and sells at most discount auto parts stores for about half the price of the Hurst.)

Some Conclusions

While reading through these instructions, and especially while performing the transmission swap, it is often recognized that it is not the swap itself that provides the greatest difficulty, but in the ancillary things like linkages, mounts, clearances, and the like. Any good installation should consider all the points in this article and also allow for time, energy and funds for the dozens of variations in drive train conversions that cannot be anticipated. With a little clear thinking, ambition and ingenuity, the SM420 conversion can be a strong and reliable.

We strongly suggest that you keep these instructions and the following, associated parts list for future reference. For questions concerning your conversion, contact the 4wd retailer or technician you bought the kit from. If you bought your conversion kit directly from us, contact us and we'll make every effort at answering your questions.



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Novak Kit #423 includes:

- ☐ Adapter, Novak #423
- ☐ Shaft, transfer case input
- ☐ Safety clamp ring
- ☐ Seal, oil, National #472319
- ☐ Studs (5)
- ☐ Nuts (5)
- ☐ Gasket, #9049
- ☐ O-ring, #568258
- ☐ Instructions

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, nor the injury to the individual, or damage to property. Always exercise care and good judgement when installing this, or any other

