

## Introduction

We hope that the installation of your new Novak adapter assembly goes very smoothly and that you achieve the improved results with your Jeep® that you intend. This kit is for adapting the pre-1980 4wd Muncie SM465 to the Jeep® Dana Model 300 transfer case, as found in 1980 to 1986 Jeep CJ5's, CJ7's and CJ8's.

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. Contained in these instructions are the requirements, tips, hints and tricks of years of performing these conversions, both in our own facility and information we've gained from discussing this swap with our customers. Put this information to good use.

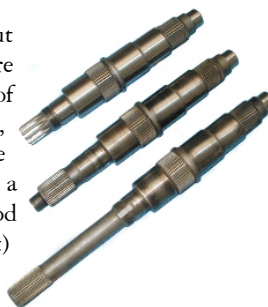


## About the SM465 Transmission

The Muncie SM465 is a heavy-duty compound low transmission used in 1968 to 1991 GM trucks. It is a very strong transmission with all gears synchronized except first and reverse. Its durability, gearing and ready compatibility with GM bellhousings, and modifiable compatibility to some AMC bellhousings, make it a prime Jeep conversion transmission.

## Identification

The SM465 has a case length of 12". It is also identifiable by its large, 5-1/8" diameter input bearing retainer. The case itself is generously ribbed both vertically and horizontally. There are three different versions of this transmission - the differences lying mainly in the output end of the main shaft. The early four-wheel-drive version (picture, uppermost), from 1968 to 1979, has a 10 spline involute output shaft that sticks out 2-5/8" from the rear face of the transmission case. The second variety is the two-wheel-drive style (picture, center) that has a 35 spline output shaft with a threaded end. This version spanned the entire production period of the SM465. The later four-wheel-drive version, 1980-on, main shaft (picture, lowermost) is the longest, has 32 splines and is not compatible with our kits. However, any SM465 can be made to be compatible by the use of our main shaft versions of our kits.



## Compatibility

The 465 is compatible primarily with GM bellhousings from 1968 to 1989 trucks. The key dimension is the locating bore of the bellhousing which is 5-1/8". Apart from this, the bellhousing has the same bolt pattern as other GM standard shift versions. If you need to join this transmission to a GM bellhousing with the 4-11/16" bore, it can be done. The bore must be opened up to 5" and the retainer turned down to 5" as a .005" to .008" slip fit. This can be done by a good local machine shop. We can also provide this service upon request.

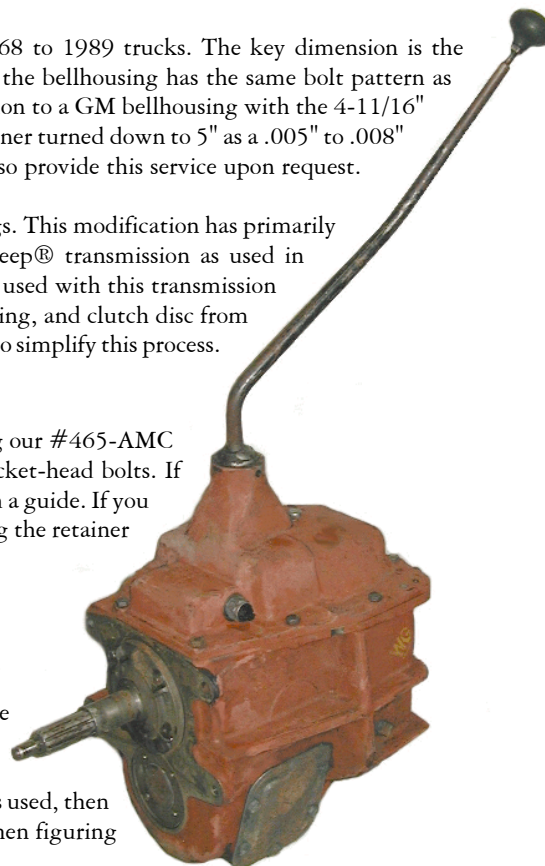
The 465 may also be made to be compatible with AMC bellhousings. This modification has primarily been developed for conversions replacing the SR4, T4 and T5 Jeep® transmission as used in 1980-86 CJ vehicles. 1972-79 AMC 6 and V8 engines can also be used with this transmission but must be equipped with a bellhousing, release arm, release bearing, and clutch disc from a 1980-1986 6-cylinder CJ. Our Kit #465-AMC can be purchased to simplify this process.

## Adapting the SM465 to AMC Bellhousings

You can save some parts chasing and cost of machine work by using our #465-AMC kit as it has a modified 465 retainer, special pilot bushing and socket-head bolts. If your machinist does do the work, the following section will offer him a guide. If you are using our #465-AMC kit, skip the information about modifying the retainer and pilot bushing that follows.

### Modifying the Retainer

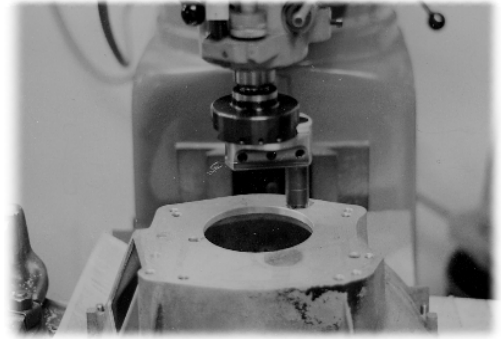
The 465 front bearing retainer will be modified by machining the large diameter of the retainer in a lathe. This will be reduced in size from 5.125" to 5.000". Machine a steel bushing in a lathe to be a light press fit on the Muncie front bearing retainer. If using a new retainer, the dimensions of this bushing will be 1.371" inside diameter, 1.430" outside diameter, and 2.625" long. If the retainer is used, then inside dimension must be compensated for wear on the retainer when figuring the size for the press fit.



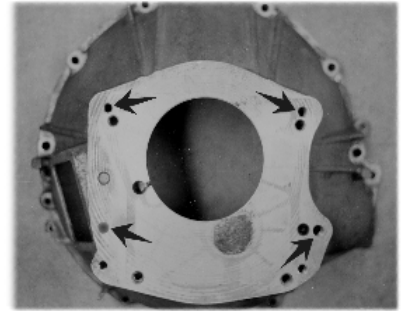
### Pilot Bushing

A special pilot bushing is required and can be made as follows: Machine a piece of aluminum or steel to 1.816" outside diameter, 1.093" inside diameter and .500" long. Press a standard Chevy pilot bushing (Dorman #690-014) into this adapter and press the adapter/pilot bushing into the AMC crankshaft torque converter bore.

Install the modified retainer on the GM transmission using 5/16-18 x 7/8 socket head (Allen) bolts. The transmission locating bore on the rear face of the bellhousing must be bored out to 5.003" to 5.008" diameter. This procedure will require a vertical milling machine or a large lathe. With this type of equipment the bellhousing modification is quick and easy and should be able to be done at a local machine shop. If you cannot get this done locally, we can provide this service, as well as drilling and tapping of the bellhousing. Place the bellhousing on the floor, engine side down (you may have to put a couple of 2x4's or similar under it) and stand the transmission on its face on the bellhousing. In other words, just like it would be in use, only now it's standing vertically. Align the cover gasket surface of the transmission with the dowel pin holes in the bellhousing. Transfer the mounting bolt hole pattern of the transmission to the bellhousing. Drill the two upper holes with a letter "U" or 23/64" size drill and tap these two holes 7/16-14.



If the SM465 has lower holes that are not threaded, proceed as follows: Drill the lower drivers side hole of the 465 through with a 1/2" drill. Drill the lower passenger side hole with a 27/64" drill and tap this hole 1/2-13 thread. On the lower drivers side hole, install a 7/16" bolt with the head inside the bellhousing and a nut and lockwasher at the ear of the transmission. Use a 1/2-13 bolt in the passenger side lower hole. If the 465 has lower holes that are threaded proceed as follows: Drill the lower drivers side hole through the bellhousing with a 15/32" drill. This bolt will be 7/16-14 with the head inside the housing. Drill the lower passenger side bolt with a letter U or 23/64" size drill and tap this hole 7/16-14. A 7/16-14 bolt should just pass through the lower ears on threaded type 465 transmission. If not, a few strokes with a round file will provide clearance.



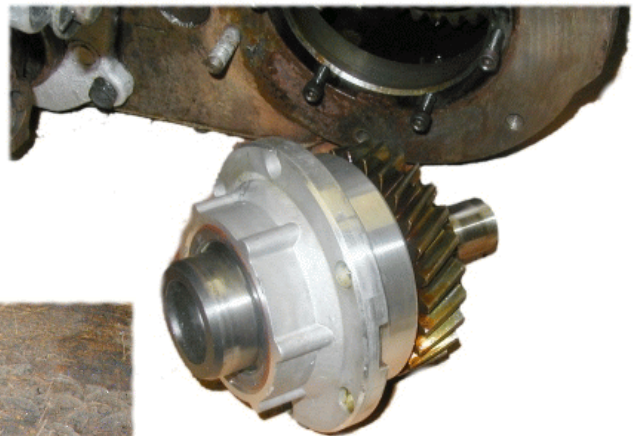
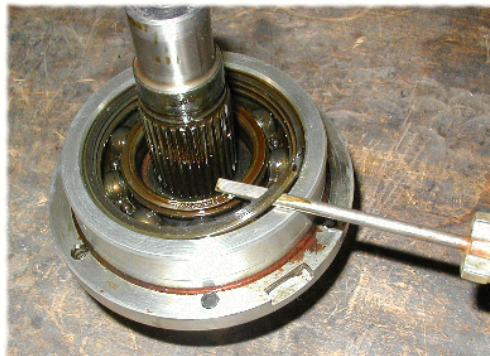
Drill and tap new holes into the AMC bellhousing

While these written instructions may sound complicated, the actual procedure is really quite simple and the end result is most worthwhile.

### Replacing the Transfer Case Input Shaft

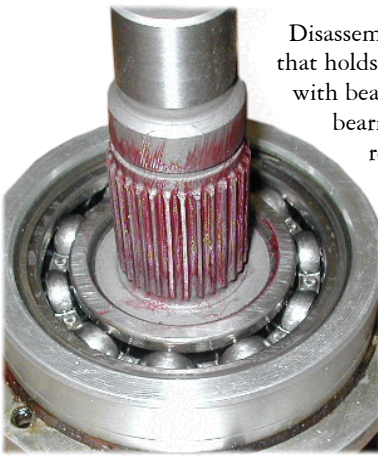
Because the Novak conversion shaft replaces the input shaft of the Model 300 transfer case, removal and disassembly of the aluminum retainer assembly is required. This is a simple process.

You should first, trial fit the new input shaft to the 465 output shaft. Pay particular attention to the spined shafts and how they mate up. There is a certain amount of variation in factory shafts due to wear and other factors. We have splined our shaft tight enough to virtually eliminate both wear and the risk of breakage. Make sure your output shaft splines are clean and free of rust. You may need to polish or clean the factory splines. Do make sure they slide together by hand. Do not use the adapter bolts to bring the assembly together. They should slide with nothing more than minimal resistance. Once trial-fitted, grease the shaft splines before final assembly. Note that if your particular output shaft has some wear, that the unique spline design has an involute tooth form. This is a self-centering, auto compensating spline by



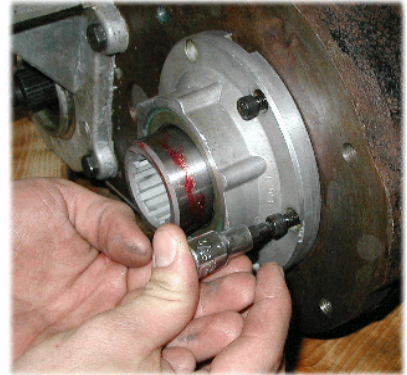
design and as such negates any looseness you may perceive.

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 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.



**Grease those splines.**

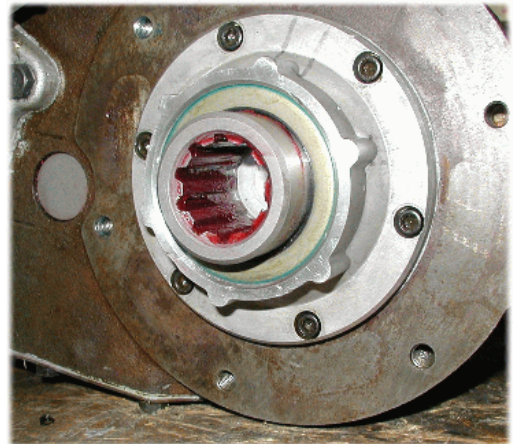
Disassemble the front retainer by removing the snap ring and gear. Remove the large retaining ring that holds the bearing in the casting and remove the shaft with bearing. Press the bearing off the shaft. If the input bearing or seal in the Model 300 retainer is to be replaced, now is the time. Press 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 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.



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

(black grease) or a synthetic grease on the splines of the input shaft that engage the transfer case input gear splines. Next, grease the new input shaft splines that mate to the transmission output shaft.

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. At this point, you may reinstall the two studs unless you intend to replace them with bolts. Once this is completed, reinstall the input shaft assembly in the reverse manner as it was removed.

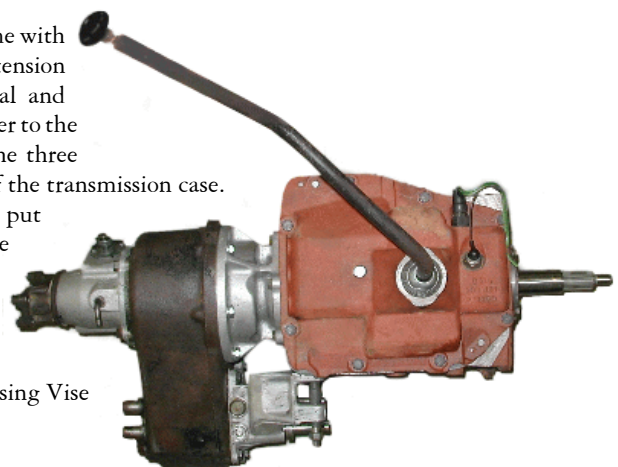


**Grease these splines, too.**

Note that 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 for details.

## Adapter Installation

Remove the original tailhousing or adapter (in the event that they came with the transmission). The adapter will now replace the original extension housing with the following notations: First, lube the adapter seal and transfer case input shaft before installing adapter. Assemble the adapter to the transmission as follows. Next, screw the coarse threaded ends of the three studs (supplied with the kit) into the three upper holes in the rear of the transmission case. These are the three holes in the adapter, into which it is difficult to 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 transmission rear face. These 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.

### Transfer Case Installation

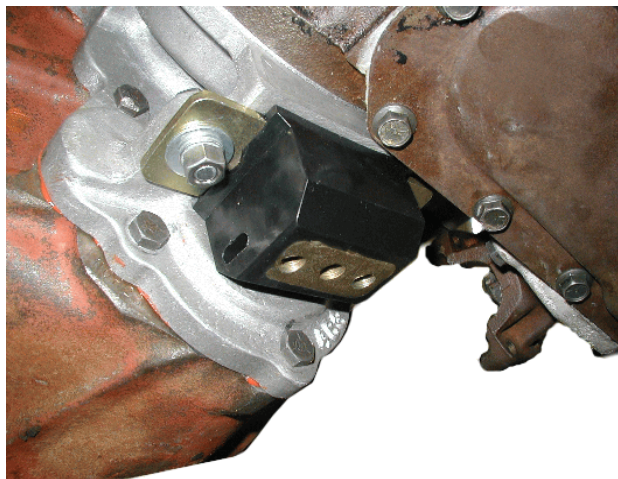
At this point, the large O-ring goes in the groove in the face of the adapter to prevent leakage of gear lube. *Do not* use RTV sealant in the O-ring groove. RTV, like hydraulic fluid, will not compress. Assemble the transfer case to the adapter using the original bolts. Sequentially cross tighten these bolts in stages to 35 ft. lbs.

### Mounting the Drivetrain Assembly

The rear mount from the 1980-86 CJ could be used by filing the bolt holes in the mount to the 3-3/4" dimension of the Chevrolet mount, but we find this factory mount to be restrictive and difficult to work with. Its supposed anti-twist design is mediocre at best. As such the adapter is drilled to use the rear mount from a Muncie truck four-speed. The adapter is drilled to accept the regular two-bolt rear mount used on a wide variety of GM applications. This is a Novak #RMU (urethane) or a Borg Warner part #31-2268 and will mount on the adapter using bolts, nuts and lockwashers.

The transmission should be mounted on its mounting pad using a regular Chevy rear mount cushion of the two bolt style (as opposed to the single stud type). Depending on whether the skid plate/cross member is mounted in the forward or rear set of holes in the frame.

Installation of the 465 will sometimes be in conjunction with a GM engine swap in most cases. It should be noted that the Jeep engine and transmission were not centered in the frame but offset about 1 1/4" towards the drivers side. To maintain rear driveshaft alignment the new engine and transmission should be installed with this offset.



Novak #RMU as installed.

### Driveshafts

Since this transmission-adapter combination is the same as the Jeep SR4, T4 and T5 transmissions, the rear driveshaft will not usually require any changes in length when using this kit. However, there are multiple ways to install a conversion engine (often used with this transmission) and the following will be of note:

It is seldom a good idea to allow the driveshafts to make the decisions as to where the powertrain will be placed. 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.

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. Any changes in driveshaft length 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. Our experience has shown that some stock Jeep drive shafts are not quite the correct length from the factory to begin

#### About Your Novak Adapter

The Novak #463 adapter kit is built to high standards of design, materials and build. The adapter housing is cast of 356-T6 aluminum and is gusseted for remarkable strength. Our adapter shaft is machined of a triple-alloy gear steel, specially hardened and precision ground for strength and longevity. Your adapter kit has been shipped fully assembled with seals and bearings installed and lubricated for initial spin-up.

The design of this adapter is such that it precludes the need to buy a special transfer case front output yoke.

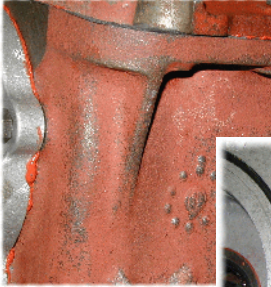
Novak warrants your adapter and shaft against defects of workmanship and materials for the life of the vehicle. This warranty is non-transferable and requires a copy of your invoice as documentation. These components are not warranted against damage or defects resulting from improper installation, including 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 fair discretion of Novak, Inc.

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

with. This can be corrected if the driveshafts are modified.

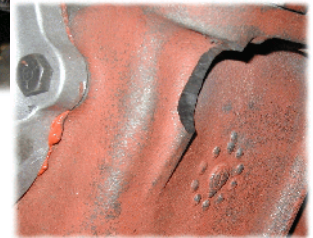
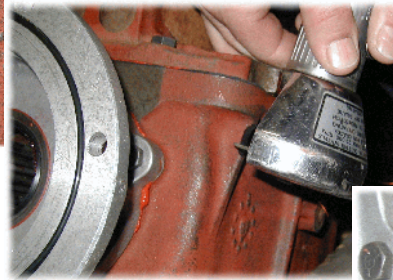
### Transmission and Transfer Case

Before installing the transfer case shift the end closest to the transmission (the end is only about 1/32 to 1/16 of an inch clears the transmission case. Also, remove from the passenger side rear of the 465 underside of the top cover gasket flange. removed with a hacksaw or by grinding. not weaken the case but provides the transfer case shifter pivot shaft, as per



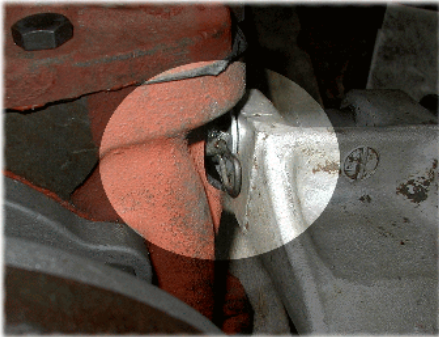
### Linkages

lever, modify the mounting shaft by sawing or grinding where the pre-load washers and retaining pin go) so there beyond the retainer pin hole. This will insure the shaft the small stiffener web trans case. This is on the The web can be Removing this web does additional clearance for the images.



The Jeep floorboard piece can be modified to clear the transmission top cover.

The top cover should be on the transmission when installed. This will prevent having to make a large cut in the driver's side of the body. The driver's side of the body will only require a notch approximately 1/4 inch wide and 3-1/2 inches long to make sure the side of the shift tower does not touch the body.



A Hurst® (part #114-7494) or Spark-O-Matic® large boot works very well for this application.

### 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 drivetrain conversions that cannot be anticipated.

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, or if you bought your conversion kit directly from us, contact us and we'll be happy to answer your questions.

#### Novak Kit #463 includes:

- ☐ Adapter, Novak #463
- ☐ Shaft, transfer case input
- ☐ Seal, oil, National #471869
- ☐ Gasket, #10148
- ☐ O-ring, #568-258
- ☐ (3) Studs, special
- ☐ (5) Nuts
- ☐ 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 component on your vehicle.



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