Ask the Expert

Tips for Diagnosing Manual Transmission Problems

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Table of Contents

Article Number 1  
5 Tips for Rebuilt Remanufactured Manual Transmission Replacement by Trans Repair Expert  

Article Number 2  
Got Manual Transmission Failures? Replace or Rebuild your Trans, Ask the Drivetrain Repair Experts  

Article Number 3  
#3 Expert Advice When Selecting the Best Rebuilt 4x4 Truck Replacement Transfer Case  

Article Number 4  
#4 Got 4X4 Truck Problems? Get a Rebuilt Transfer Case from On or Off Road Drivetrain Expert  

Article Number 5  
Got Transmission Problems? Get Parts for Your Dodge NV5600 and Help from an Expert at MTC  
Table of Contents Continued

Article Number 6  Page 17

Article Number 7  Page 19

Article Number 8  Page 22

Article Number 9  Page 25

Article Number 10  Page 27
5 Tips for Rebuilt Remanufactured Manual Transmission Replacement By Trans Repair Expert

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Not selecting the best supplier for a re-built transmission replacement can get very expensive according to Transmission Repair Expert, Scott Schleck of Midwest Transmission Center in Zumbrota, MN. We can help you remove the questions marks and possibilities of getting a poorly re-built transmission. We can assist you in assessing transmission problem with transmission repair experts. Here are a few things to remember when ordering a rebuilt manual transmission:

- Select an experienced vendor with a modern facility and test equipment
- Ensure that you are getting an updated direct drop in replacement
- Be sure to find a vendor with a great warranty and well-trained experienced technicians
- Choose a vendor with aggressive spin and shift testing at rated RPM on an advanced Dyno testing machine, Factory Dyno Testing

Midwest Transmission Center offers the following solutions to ease the pain and consequences of extended vehicle downtime and paying return freight for the incorrect unit that you ordered. Or for an in correct or non-functioning transmission built by an inexperienced supplier!

Let us save you the time and hassle and help you get the best manual transmission the first time. Lowest price does not equal best value.

- Select a vendor with experience and modern facilities. Midwest Transmission Inc. has been supplying rebuilt manual transmission since 1996. As an industry leader, we offer a full line of high quality (foreign, domestic, 4x4, 4x2, FWD and RWD) overhauled manual transmissions. Our 30,000 square foot Zumbrota, MN production facility employees 22 trained experience personnel. Our staff includes production, testing, inventory control, as well as a full staff of customer service experts. Production totaled 7500 finished standard transmissions last year. We have hundreds of finished units in stock ready to ship.
• **Are you getting a direct drop-in replacement?**
  It is critical that you are sure that you have identified the exact manual transmission that you are trying to replace or overhaul. Our software will assist you in the identification of the manual transmission in your vehicle. You input vehicle manufacture model, year and engine size, 2wd or 4wd, and the program will tell you what your vehicle left the factory with. Look for identification tag on the side of the existing transmission; also some vehicle manufacturers list the transmission model number on a tag located on the engine firewall near the master cylinder.

Another easy way to get the standard transmission model number is to call your local dealers parts department with the VIN number. The dealer can look up the model number in their computer system. Without proper identification you could order an incorrect transmission and end up having to pay extra freight charges and lose valuable time.

Midwest Transmission Center (MTC) provides exchange rebuilt manual transmissions, we can supply a core, or if you would like we can rebuild your existing core. You already have a used transmission. We don’t recommend you purchase another one! Rebuilding or replacement will give you a much longer service life.

• **Warranty**
  One of the most critical elements in ordering a replacement manual transmission is the warranty. Believe it or not, some people are purchasing these transmissions without a warranty. Midwest Transmission offers a 12-month hassle-free warranty. Extended warranties are also available.

• **Are the builders experienced?**
cleaning and inspection. Critical elements to be inspected are the case, input, main, output and counter shafts. Every unit receives new bearings, gaskets, seals and syncro rings. Items with low life expectancy are always replaced. All remanufactured manual transmission includes the latest known compliance updates to fix original manufacturer design defects.

Upon completion of the assembly process each unit receives a number of testing cycles in our Dyno testing stations; this ensures total quality in the unit you receive.

Need help? Give us a call toll free 888-824-2012. We offer free technical support to ensure you have identified your manual transmission correctly. We will help you determine your manual transmission problem and if you need to or can rebuild/overhaul the unit or whether you will need a rebuild replacement unit from Midwest Transmission Center.

We also offer overhaul kits that include all bearings, gaskets, seals and syncro rings. Hard parts are available. Be sure to ask about our large inventory of good take out (used) parts. Let us help save you money by calling 888-824-2012. You can reach technical support at 507-421-8833. For more information, visit www.midwesttrans.com.
Incorrect diagnoses of **manual transmission failures** can cost you a lot of money and vehicle downtime, according to Transmission Repair Expert Scott Schleck of Midwest Transmission Center in Zumbrota, MN. Midwest Transmission Center Inc. (MTC) provides free technical support to assist you in the correct identification and resolution of your **manual transmission repair**.

Five of the most common problems with **manual transmission failures** are:

- Noise on acceleration and noise on deceleration
- Hard to get into gear
- Grind going into gear
- Popping out of gear
- Will not shift from gear to gear

**Noise on acceleration and noise on deceleration**

Noise is a sign that parts are wearing prematurely or a sign of extended mileage. A worn bearing retainer can cause noise in manual transmissions. This is an easy part to replace. The bearing retainer is the front part of the transmission where the throw-out bearing rides. When replacing, it's a good idea to replace the bearing retainer seal, gasket and the throw-out bearing. Worn input bearings, worn input shaft, pocket bearings and worn output and counter shafts can also cause noise. NV5600 transmissions are known for noise on acceleration. NV3500 have shown problems with noise on deceleration. Give Midwest Transmission Center (MTC) a call and get the correct **manual transmission repair** the first time.

A manual transmission that is low on fluid can also emit a humming or whirring noise. Failure of the pilot bearing that is pressed into the flywheel can also lead to manual transmission problems. Leaking of transmission fluid is typically caused by ruptured or worn gaskets or loosened bolts or by damage to the case or housing. Most manual transmissions have a
bushing in the rear output housing that can wear excessively, caused by a rear driveshaft that is out of balance. You should also inspect the main case and rear housing for cracks that can cause failure. MTC recommends changing the transmission fluid on a yearly basis. The wrong lubricant is a common problem. For the correct fluid for your manual transmission lube recommendation, see our Web site at www.midwesttrans.com.

**Hard to get into gear**
This is a little tricky because you need to inspect the clutch assembly to ensure that it is working properly, does not have excessive wear, and the clutch is in good working order. If you find the clutch is in good working order, it’s time to disassemble the transmission and inspection components. Inspect the input bearing and input shaft. Worn or broken shift forks or a shift rail can also cause this problem. In addition, inspect the shift pads on the forks and the shift syncro rings and hubs. This is a common problem with the Nissan FS5W71 transmission.

**Grind going into gear**
This problem can be traced to worn input shaft and 1st and 2nd gear syncro rings, synchronizers (which allow the gears to mesh). Incorrect adjustment of external shift linkage can also cause this problem. GEO Metro transmissions are known for this problem. Midwest Transmission Center can supply the parts you need for the re-build process.

**Popping out of gear**
This problem is caused by excessive wear on syncro rings, syncro hubs and/or sliders. Excessive wear in bearings allowing shafts to move, ZFS650 Ford 6 speed Transmissions display this problem.

**Will not shift from gear to gear**
This problem can be caused by excessive bearing wear and manifests itself in higher mileage vehicles. Excessive bearing wear allow the shafts to move forward or back out of tolerance. Gears have been known to back off the shafts. The early NV4500s, a 5 speed manual transmission used in both Dodge and Chevrolet HD pickup truck, lost 5th gear due to the vehicle being lugged at stop through signs. Update kits are available to rem-
edy this problem. Ford ZF542 transmissions have a 5th gear/reverse gear issue caused by shifting into reverse before coming to a complete stop.

Can you overhaul the unit?
In our experience we found that the majority of our customers are capable of removable and replacing the unit. In general, this task can be accomplished in four to six hours. Before removing the driveshaft, be sure to clock (mark) the unit using a metal punch, mark both mating flanges front and rear to ensure that the driveshaft is reinstalled in exactly the original position. This will maintain the driveshaft balance integrity.

Another critical area to pay attention to is the clutch disk; you would be surprised how many customers install the clutch disc backwards. We recommend that you also install a new clutch kit at the time of the manual transmission replacement. We usually do not recommend that the average person attempt an overhaul project; you will need to have some good mechanical experience. Tool requirements are generally minimal, but you must have the time and temperament. Take lots of photos of the disassembly process.

When you decide to replace your failed manual transmission, give Midwest Transmission Center a call. If you decide to rebuild your unit and purchase the parts from Midwest Transmission and need help, just give us a call toll free at 888-824-2012. You can reach free technical support at 507-421-8833. We have the answers you need. For more information, visit www.midwesttrans.com.
Expert Advice When Selecting the Best Rebuilt 4x4 Truck Replacement Transfer Case

www.midwesttrans.com

Not selecting the best supplier for a rebuilt 4X4 truck transfer case can cost you a lot of extra money and time, according to Transfer Case Repair Expert Scott Schleck of Midwest Transmission Center in Zumbrota, MN. Considerations for getting the correct replacement transfer case or transfer case rebuild kits are: ensure that you are receiving a direct drop-in replacement and be sure you are getting a great warranty, quality material and workmanship, plus factory testing. If your existing transfer case is not identified properly, you will not receive a direct drop-in replacement, the yokes/splines may not match, and switches may not plug-in. If your transfer case uses an encoder motor, it may not fit or work.

The unit will have to be returned and you will pay extra freight charges (return freight on incorrect unit and return freight on correct unit). Midwest Transmission Center will help you ensure the unit you order is a direct drop-in replacement. You will benefit by letting us help you get the correct rebuilt 4x4 transfer case the first time!

The benefits of buying a rebuilt transfer case from Midwest Transmission

With Midwest Transmission Center, you get a direct drop-in replacement, superior purchase price and a realistic core cost, plus prompt refund of your core money, no hassle. Avoid the painful consequence of receiving an incorrect transfer case. Below our expert tells you 5 things you must consider before purchasing a replacement transfer case:

- **Making the correct decision when purchasing a transfer case**

  We ensure you get the correct unit. Prior to the order Midwest Transmission will assist you in finding the transfer case assembly number. The as-
assembly number is assigned by the factory and identifies the bill of material that your transfer case is assembled to.

- **Get a transfer case with longer life**
  Midwest Transmission rebuilt remanufactured transfer cases offer longer life. After disassembly of the transfer case we perform a detailed parts and case cleaning and inspection to OE specifications. Marginal parts are replaced, including all new bearings and gaskets. Seals chain and shift fork pads are installed. All rebuilt transfer cases are updated to the latest compliance specifications, eliminating all known factory design defects.

- **Best Transfer Case Warranty**
  Our standard no-hassle warranty is one year with longer warranty periods available. Ask your custom service representative at time of purchase.

- **Only Quality Parts used in Midwest Transmission Transfer Cases**
  An important criterion in purchasing rebuilt transfer cases are the knowledge that the unit is assembled using only parts that are supplied by high-quality manufacturers. Improved workmanship is your gain as all units are built in a factory environment. In most cases we only use Nachi and Koyo bearings, Chicago and National seals; we prefer using genuine chains manufactured by Cloyes for their non-stretching characteristics. We manufacture our own CNC produced case savers. We install update rear output shaft snap ring, and the viscous coupler is replaced.

- **Transfer Cases are Factory Tested**
  Each transfer case is tested before leaving the factory; the test procedures include pressure testing to ensure that the seals are tight and not leaking. They are also spin-tested to ensure correct assembly and that there are no noise or shifting problems.
Got 4X4 Truck Problems? Get a Rebuilt Transfer Case from a Drivetrain Expert

If you don’t diagnose your transfer cases problem correctly, you could waste a lot of money. Midwest Transmission Center (MTC) can help you; we can provide a free transfer case part illustration drawing and technical support. 4x4 truck transfer cases generally fall in to three categories: units built by New Process, New Venture and Borg Warner. When selected by the driver, the transfer case provides power to both the front and rear differential through two separate driveshafts. Power is provided in two different gear ratios, high and low range. Power is directed inside the transfer case by either a chain (most common) or gear drive, i.e. the Heavy Duty NP205 transfer cases are the most popular unit for off-road applications due to the strength of the unit.

Transfer cases generally have 4-High and 4-Low ranges and 2-High. The ratio in 4H is generally 1:1. Transfer cases are supplied as manual shift or electric shift. Other model transfer cases that we can supply are: NP119, NP129, NP133, NP136, NP203, NP205, NP207, Np208, NP219, Np228, Np229, NP231, NP233, NP236, NP241, NP241LD, NP241HD, NP242, NP244, NP246, NP247, NP249, NV235, NV261XHD, NV263XHD, NP271, NP273, Dana 20, Dana 24, Dana 28, Dana 143, Dana 300, BW1345, BW1350, BW1354, BW1356, BW1370, BW1372, BW4404, BW4405, BW4406, BW4407, BW4411, BW4422, BW4470, BW4473, BW4481, BW4482, NV125, NV126, NV163, NV242, Tracker Sidekick, Honda, Isuzu, Mazda, Mitsubishi, Nissan, Range Rover, NV225, W100, R100, LC12, LC14, LC16, LC18 Toyota.

Before you start to diagnose your 4x4 truck transfer case problems, the first thing to check is your tires. Make sure tire pressure is the same in all four tires (per vehicle manufactures specification). Check that all four tires are the same diameter. You would be surprised how many transfer case problems can be traced to tire problems.

Six of the most common problems with transfer case failures are:

**Noisy Transfer Case**
Knocking from the front end when turning with AWD transfer cases like in the NV247 Jeep, the BW4404 Explorer, and the NP249. Knocking is an indication that the viscous coupler is worn out and needs to be replaced.

**Noisy Transfer Case when changing range or mode**
Hard to get into gear. Transfer case will not shift into 4H. It will drive in 2H and 4L but will get a grinding noise at times. We recommend that you change mode
slider and range hub. If you have high mileage, we suggest you install a new bearing overhaul kit, new chain and updated snap ring on output shaft.

**Transfer Case Grinding going into gear**
May be a problem with automatic hubs on front differential. MTC suggests you change to manual locking hubs.

**Transfer Case Popping out of gear**
This problem is fairly common. As an example we will select NP241 in a 1997 Chevrolet. The following replacement parts are recommended to fix the problem: input shaft, range hub, mode slider, drive gear, updated snaps ring kit, gasket and seal kit.

**Transfer Case or Seal failure**
Transfer cases can be destroyed by loss of lubricating fluid. These failures will generally fall into two categories: case damage or gasket/seal failure. Case failures can be caused by driveshaft failure under power, causing rear case failure. Case failure caused by high centering on a tall object under vehicle. A more recent failure is a factory design defect; this defect allows the oil pump to wear a hole in the case and fluid loss. We provide a case protector and recommend that you install this component before you are faced with a large expense. A dead give-away for imminent transfer case failure is a pool of lubricant on your driveway.

**Transfer Case Shift (Encoder) motor failure**
You switch on 4H without problem. Pressing the 4L button only makes the button light switch on and low range does not engage. No noise can be heard while trying to switch. I tried all procedures (neutral, slow forward / backward driving...). Replacement remanufactured encoder motors are available to fix this problem. In most cases this part replacement can be made without dismounting the transfer case.

Another tip to solving your transfer case problem is always having the driveshaft’s high speed balanced, both front and rear at the time you re-install your new transfer case.

Ready to place your order or need additional information? Please call toll free 888-824-2012. Midwest Transmission can provide a rebuilt transfer case and/or a rebuild overhaul kit or hard parts. Save money by getting the correct quality parts the first time. If you purchase the parts from Midwest Transmission and need help, just call the Drivetrain Expert. It’s free. We have the answers you need. For more information, visit
5 Steps for How to Rebuild or Repair a Manual Transmission with an Rebuild Kit from an Expert

www.midwesttrans.com

Transmission repair is possible if you follow standard procedures for dis- assembly, and reassembly can cause you major difficulty and cost you money. According to Manual Transmission Rebuild expert, Scott Schleck, of Midwest Transmission Center in Zumbrota, MN, you will need good mechanical skills, a set of mechanics tools and good instructions. If you purchase the manual transmission overhaul kit from Midwest Transmission Center, we provide free technical support during reassembly. Incorrect rebuilding of your manual transmission can cost you time, money, and a lot of frustration.

The following 5 key points on how to rebuild transmissions are provided by Midwest Transmission Center Inc. (MTC) to assist you in rebuilding your manual transmission. These instructions are for a popular 5-speed transmission used by Chevrolet and Ford and are meant as general guidelines:

- **Disassemble Manual Transmission**

  Before starting this disassembly process we suggest you acquire a free exploded parts diagram of your transmission, check our images.
Clean the exterior of the manual transmission, drain the transmission fluid, and shift the transmission into neutral. Remove the shift lever (stub). Remove all external switches and neutral safety switch.

Remove shift rails and extension housing. Remove the case cover (for top loader) and then remove and inspect the shift rails and bushings. Remove the shift fork and plastic shift forks and inspect. Remove and inspect the Speedo-gear. Remove the bearing retainer, align the counter shaft and input shaft and remove the input shaft. Remove and inspect the pilot bearing between the input shaft and main shaft. Remove thrust race and bearing for the end of the output shaft. Remove the output shaft.

- Disassemble the output shaft components. A gear/bearing puller will be required. Remove 1st gear and then from the other end of the shaft remove 3rd gear, remove blocking rings 3rd and 4th syncho assemblies. Next remove the reverse fork and idler gear. Remove the counter shaft gear, disassemble 5th gear synchro- nizer assembly (mark all syncro sleeves and hubs so that clutch teeth are matched sets and reassembled in the same position. Now disassemble the 3rd 4th syn- cro assembly.

- Cleaning parts and inspecting manual transmission

  We recommend that you use a brush and cleaning solvent to remove all old lubricant, dirt and gasket material, some scraping may be required. We find that while drying all parts is a good time for inspections. Inspect all gears for chips, nicks, inspect all shafts and splines for galling and inspect case, tail housing and bearing retainer for cracks. Check syncro hubs and sliders for
teeth rounding that would cause them to jump out.

- **Acquire overhaul kit or need hard parts for your manual transmission**
  
  We suggest that you lay out all parts on the bench in groups and determine what hard parts will need to be replaced (if you would like to review parts requirement just give us a call toll free 888-824-2012.) We suggest that you order our BKWS manual transmission overhaul kit. It includes all bearings, gaskets, seals and syncro rings and fork pads. Other parts that you will probably want to replace are the output bushing, shaft nuts and a snap ring kit.

- **Reassembly or your manual transmission**
  
  You will need a torque wrench for reassembly. Coat all parts with lubricant, lubricate all o-rings and seal lips to prevent damage. Soak all blocking rings assemblies and outer cone races in transmission lubricant. Lubricate all bearings, cones thrust bearings and needle bearings.

- **Start by assembling the 3rd and 4th syncro assembly, then assemble 5th gear syncro assembly**.
  
  Install countershaft gear, next install reverse fork and idler gear. Assemble the output shaft assembly, including all bearings, spacers, snap rings and gears. Install the speedo gear on the output shaft. Next install the 5th gear, shift fork and syncro assembly, now install the 5th and reverse shift lever. Assembly and install the shift forks and cover. You are now ready to install the extension housing. Adjust the input output shaft bearing preload using a shim set; you will need a depth micrometer. Install the bearing retainer; you are now ready to install the control lever and external housing assembly.

- **DIY Manual Transmission Testing**
Got Transmission Problems? Get Parts for your Dodge NV5600 and Help from an Expert at MTC

www.midwesttrans.com

Problems with your Dodge NV5600 6 speed manual transmission can cost you a lot of money and downtime, according to manual transmission rebuild expert, Scott Schleck, of Midwest Transmission Center in Zumbrota, MN. The Dodge NV5600 is a constant mesh, manual transmission with a wide gear ratio range, full synchronized, Six Speed Overdrive. The NV5600 manual transmission is factory rated fat 540 lbs. ft. of torque. Cast iron is used in the manufacturing of the bearing retainer, main case. Ratios are: 1st 5.63:1, 2nd 3.38:1, 3rd 2.04:1, 4th 1.39:1, 5th 1:1 and 6th gear overdrive of 0.73:1 with reverse being 5.63:1. Need parts for your Dodge NV5600, Midwest Transmission Center can help you and save you some money!

While the NV5600 manual transmission has good reliability and is durable, it is well-suited for towing with high horsepower. Common failures generally are due to heavy usage and damaged 6th gear. Losing fluid causes damage to 1st gear and output bearing. All rebuilt NV5600 provided by Midwest Transmission includes major case modifications that provide increase oil flow to the main output bearing, improving transmission life. Five of the most common NV5600 transmission problems are:

* Noise on acceleration and noise on deceleration
* Hard to get into gear
* Grind going into gear
* Popping out of gear
* Will not shift from gear to gear

NV5600 Noise on acceleration, Noise on deceleration
Problems in this class are generally associated with input or pocket bearing failure, sixth gear failure the pilot bearing can also fail.

**NV5600 Hard to get into gear**

Transmission problems are common in the NV5600 since this transmission is more like a large 18 wheeler transmission, double clutching and the right RPMs is key to solving this problem. Also you may have a clutch hydraulics issue requiring that you replace these components.

**NV5600 Grind going into gear**

This problem can be excessive wear of syncro rings and or excessive bearing wear.

**NV5600 Popping out of gear**

This problem can be attributed to worn syncro rings, syncro sliders, gears and/or shaft movements caused by excessive bearing wear.

**NV5600 Will not shift from gear to gear**

Fluid varnish build-up on the shift rail bushing exacerbates this problem. We recommend that you always replace the shift rail bushings during the overhaul and that you only use OE lubricant from Chrysler part number 4874464. You will find this transmission fluid is very expensive at the dealer, running about $26.00 per quart. We offer the same fluid for $9.99 per quart plus S&H. We recommend that you change the fluid every 35,000 miles if you have heavy-duty use and every 45,000 miles if you have light duty.

Due to the complexity of the NV5600, we do not recommend that the average person attempt overhauling this unit. You will need a lot of mechanical experience, but if you must you should start at the rear of the unit. The bell housing is the last piece to be removed; we suggest that you take a lot of photos.

Ready to order a replacement? You can get a rebuilt NV5600 replacement manual transmission or rebuild overhaul kit or hard parts from Midwest Transmission Center. We will help you get the correct parts and save
NV4500 Giving You Trouble? Common Transmission Problems and an Exploded Parts Diagram from MTC

www.midwesttrans.com

Need to save money fixing your Chevrolet or Dodge NV4500? It’s important to get the correct parts the first time, according to Transmission Repair Expert, Scott Schleck, of Midwest Transmission Center in Zumbrota, MN.

Midwest Transmission Center (MTC) can help you with a rebuilt unit, rebuild kit or individual hard parts; below are common NV4500 problems and things that you will want to know. We have also listed our performance upgrade parts for you NV4500 manual transmission.

The NV4500 is a five-speed heavy-duty transmission used by Dodge and Chevrolet from 1994 to 2005. This transmission has a cast iron case and aluminum bell housing and extension housing. This transmission is fully synchronized and has helical gears, with dual PTO ports. This transmission from the factory is rated at about 235HP and 460ft/lbs. The lubricant used in the NV4500 is critical. We recommend OE GM part number 12346190.

Common NV4500 problems with the manual transmission have been 5th gear backing off the main shaft (gear loosens the retaining nut). Repeated overloading can cause bearing and synchronizer wear on acceleration. 5th gear countershaft clutch spline failures and 5th gear tooth breakage are symptoms of an overloaded transmission. Transmissions with high mileage always show signs of syncro problems. MTC can provide a remanufactured unit, master bearing overhaul kit including syncro rings and rebuild parts including hard parts. Ask about our high-quality take out parts (used) to help you save money.

We can provide a free NV4500 exploded parts diagram and the rebuild kits and hard parts you need.

NV4500 manual transmission noise on acceleration, noise on deceleration
Failure or worn crankshaft pilot bearing can cause noise. A clicking noise can be a sign of a chipped or broken gear. A noise like whining is most probably a bearing starting to fail. We also suggest you check the input shaft; worn pilot bearings can damage the input shaft, inspect it carefully for excessive wear or burring. We can provide a stronger upgraded and large input shaft with 1 3/8” diameter; you will need to update your clutch disk if you update the input shaft.

The NV4500 on the right has damaged the teeth on of 5th gear. This failure could be caused by failed needles under the C/S 5th gear which allowed too much clearance and caused damage. It could also be caused by too heavy of a load and lugging in 5th gear or because of added horsepower.

**NV4500 manual transmission hard to get into gear**

One of the most common problems is the 5th gear/main shaft nut backing off. We offer an upgraded main shaft with longer splines cut correctly with a newly designed retaining nut. Note: If the transmission will not go into gear with motor is running but will engage in gear with the motor off, you should check the clutch, which is probably the cause of this problem.

**NV4500 manual transmission grind going into gear**

Syncro rings are a common wear item on NV4500 manual transmissions. With this wear, the ring loses friction and will result in grinding during shifting. Chipped teeth in the shift colleen, where it engages in the teeth of the gear, can cause grinding. Forcing the transmission before the syncro has caught up can cause the problem. Incorrect fluid will have a large effect on syncro ring, shifting performance.

**NV4500 manual transmission popping out of gear**
Worn or damaged syncro rings, hub and/or slider will affect transmissions ability to stay in gear. Shift forks can show wear and can result in them not engaging the shift collar far enough into the gear. This will also affect the gear popping out. Worn or damaged fork pads, damaged shift stub or top cover can also cause this problem. MTC can provide a remanufactured top cover including forks and stub, a great update if you have high mileage.

Shown here is major damage to 3rd gear on Main Shaft and Counter Shaft probably caused by towing excessive loads in 3rd gear causing heat buildup and gear failure

**NV4500 manual transmission will not shift from gear to gear**
Damaged syncro/slider or fork problem could also be a gear wear issues and most likely is caused by worn bearings allowing the two shafts to move out of synchronisation.

Get your NV4500 rebuilt unit, rebuild overhaul kit or hard parts from Midwest Transmission. You will get the correct parts and save money with quality parts the first time. Midwest Transmission Center offers a large number of upgrades for your NV4500 including:
- Main shaft
- 5th Gear and nut
- Pilot bearing for flywheel
- Input shaft 1 ¼” to 1 3/8”
- Remanufactured top cover with shift forks and shift stub

Order your rebuilt NV4500 or parts to assist you with your rebuild project. A **NV4500 exploded parts diagram** will make the job possible. Just give us a call at 888-824-2912. We can help you save some money! Need more information, visit us at [www.midwesttrans.com](http://www.midwesttrans.com).
Improper diagnosis of Ford ZF S6-50 manual transmission problems can cost you a lot of money and time according to Manual Transmission Rebuild expert, Dan Schoenfelder, of Midwest Transmission Center in Zumbrota, MN. We provide free technical support to assist you in making the correct diagnosis. We also offer rebuilt units and rebuild parts for ZF S6-50. The ZF S6-50 is a heavy-duty 6-speed transmission; ZF designed this transmission for high torque applications, heavy hauling, and diesel applications. Ford started using ZF S6-50 manual transmissions in 1998 and GM Chevrolet started using it in their 2002 model year (units are not interchangeable as the cases, input and output shafts are different). This transmission features synchronized gears, 2nd and 3rd gear feature dual-cone synchros.

Five of the most common Ford ZF S6-50 manual transmission problems are:

- Noise on acceleration and deceleration
- Hard to get into gear
- Grind going into gear
- Popping out of gear
- Will not shift from gear to gear

**ZF S650 manual transmission noise on acceleration and deceleration**

ZF engineers specifically designed this transmission with high helix angle gear to provide increased contact ratio and promote quieter operation. This transmission is known for gear rattle when the truck is in neutral. Midwest Transmission Center (MTC) suggests that you not spend money chasing this problem in the transmission. First inspect the dual mass flywheel and clutch area.

**ZF S650 manual transmission hard to get into gear**

The ZF S6-50 shifts slower than most transmissions, jerky shifting particularly in third gear has been a problem, clutch wear can have a large effect on smooth shifting. MTC can provide a short throw shift kit, upgraded stub
to improve shifting problems. We recommend you use 5.5 lt. of synthetic Mercon ATF lubricant.

This high mileage ZF 6 speed has significant wear causing grinding when shifting

**ZF S650 manual transmission grind going into gear**

In low to medium mileage transmissions, the problem is typically worn or damaged syncro rings or sliders. In higher mileage transmission, it can be that problem combined with worn shift forks and shift rails.

**ZF S650 manual transmission popping out of gear**

All gears are synchronized in the Z650; shifting into reverse before the vehicle comes to a complete stop can damage reverse.

In the photo on the right you can see the 2ND gear Syncro ring is bottomed out on the gear

**ZF S650 manual transmission will not shift from gear to gear**

Fifth gear has shown shifting problems, which is typically caused by the snap ring that retains the synchro keys moves, allowing the retaining ring or dog to drop out or jam the synchronizer. Other problems can be caused by damaged gears, bearing failure, shift fork, syncro/slider failure.

Another ZF S650 manual transmission problem that has been observed is a cracked bell housing. This can be caused by excessive drive line vibration. Depending upon your driveshaft length, you may want to increase the diameter of the tubing. If the truck is lifted, be sure that the driveshaft angle is less than 3 degrees, and having your shaft high speed balanced can also solve problems. Damaged or worn dual mass flywheel (check the backlash) can also cause this problem.
The Ford version of the ZF S6-50 utilizes an internal oil pump that is driven off the front of the counter shaft that circulates the fluid. The GM Chevrolet ZF does not offer this option; they recommend that you use synthetic transmission fluid. Both transmissions have one PTO cover on the passenger side.

Gear ratios 1st = 5.79, 2nd = 3.31, 3rd = 2.10, 4th = 1.31, 5th = 1.00, the overdrive gear 6th = 0.76 and Reverse = 5.23. Midwest Transmission Center Inc. offers high quality rebuilt replacements for ZF S6-50 transmissions as well as bearing rebuild overhaul kits with syncro rings and hard parts. Ask about our large inventory of both new and superior take out (used) parts; let us help save you some money!

For our customers with higher horsepower pulling heavy-duty loads, we offer cryo heat-treating for both shafts and gears. Cryogenic treating will increase strength by 30% and help parts tolerate the higher heat and additional torque load requirements of your application.

Order rebuild parts for ZF S6-50 or a rebuilt ZF S6-50 transmission from Midwest Transmission Center and you will get a factory-built and dyno-tested unit with guaranteed performance. Purchase your ZF S6-50 parts from Midwest Transmission Center and save time, money, and hassle. If you need help, just call the drivetrain experts 1-888-824-2012. It’s free. We have the answers you need. For more information, visit www.midwesttrans.com.
If problems with your ZF S5-47 Manual Transmission are not correctly diagnosed can be very expensive and cost you a lot of money and downtime, according to Manual Transmission Rebuild expert, Dan Schoenfelder, of Midwest Transmission Center in Zumbrota, MN. Below Dan provides five of the most common ZF S5-47 manual transmission failures. Midwest Transmission Center can provide ZF S5-47 transmission rebuilt unit or parts and free technical assistance with your transmission repair. If you need extreme duty and are breaking gears and or shafts, we offer cryogenic heat-treated replacement parts, which will add about 30% to the strength over the OE parts.

Photo on the right show damaged to ZF S547 caused by pilot bearing failure, leading to input and cluster gear breakdown. Possible caused by high torque loads.

Ford used the ZF S5-47 from 1995 to 1998 and the S5-47M between 1999 to 2001. This transmission is rated for 470 lb-ft. input torque with all gears synchronized. The unit came in two different ratios, both wide and close ratio variants. The close ratio version is used in F-Series vehicles with a 7.3 L diesel engine and a GVW over 8500 lbs. This transmission features an aluminum case with an integral bell housing. The ZF transmission used with the 7.3 L diesel engines requires use of synthetic Motorcraft MERCON ATF fluid. Rebuilt manual ZF S5-47 transmissions are available from Midwest Transmission Center. We can also provide rebuild overhaul kits and replacement parts. Ask about our good take out parts (used) and let us help save you some money!

Five of the most common problems in ZF S5-47 manual transmission failures are:

**ZF S5-47 Noise on acceleration and deceleration**
This problem can be traced to failure of the pilot bearing in the flywheel, also check to insure that the fluid level is correct. You should also check the bearing between the input and main shaft. Rough and excessive wear of the rear bearing on the output shaft. Noise can also be caused by excessive wear of needle bearings under main-shaft gears.

**ZF S5-47 Hard to get into gear**
1st, 2nd and reverse could be attributed to failing clutch system and or failure of the reverse syncro ring/slider.

**ZF S5-47 Grind going into gear**
Syncro ring or slider wear, excessive bearing wear allowing shafts to move out of design limits. Another common problem is excessively worn shift housing or shifter, both
of which can replace by remanufactured parts by Midwest Transmission Center.

**ZF S5-47 Popping out of gear**
Can be caused by worn syncro slider and/or possibly shift lever maladjustments. Worn input bearing and/or shift shaft.

**ZF S5-47 will not shift from gear to gear**
This problem can be caused by the following: Shift fork pads missing or with excessive wear, damaged fork or slider grooved.
This transmission can also receive damage to the front case half (bell housing) and possibly the rear extension housing as a result of a damaged drive shaft, bent, out of balance, excessive wear of u-joint or yoke. At the first sign of vibration, we suggest that you have the driveline high speed balanced. Failure of the dual mass flywheel can also break the bell housing portion of the case.
Call today to order a rebuilt ZF S5-47 manual transmission or parts; if you purchase the parts from Midwest Transmission Center and need help, just call the drivetrain experts at 1-888-834-2012. It's free. We have the answers you need. For more information, visit [www.midwesttrans.com](http://www.midwesttrans.com)
Having problems with your Ford Mazda M5R2 Manual Transmission Rebuild or Replace, Ask and Expert Scott Schleck

www.midwesttrans.com

According to Manual Transmission Rebuild expert Scott Schleck of Midwest Transmission Center Zumbrota MN improper diagnosis of M5R2 manual transmission problems can be very costly in both time and money.

The Ford Mazda M5R2 series 5-speed transmission is used in both cars and pickup trucks. Ford in 1989 Thunderbirds installed the M5R2

The transmission on the right was manufactured by Mazda, the M5R’s were used by Ford in autos and widely used in Ford Pickup Trucks.

Manual Transmission and Cougars with 3.8lt supercharge engines. Ford in 1988 Rangers, Bronco 2 and the Astrostar van, utilized the M50D. The M50DR1 was; utilized in F-series pickup and Bronco full size. You can find ID tags on the main case to confirm which model you have. These 5 speeds are synchronized and utilized constant mesh gears; this is one of the easier units to work on. Midwest Transmission Center (MTC) can help you save money and time with a re-built M5R2, rebuild kits and hard parts that you need.

Five of the most common problems in M5R2 manual transmission failures are:

- Noise on acceleration and Noise on deceleration
- Hard to get into gear
- Grind going into gear
- Popping out of gear
- Will not shift from gear to gear
Ford Mazda M5R2 Noise on acceleration, Noise on deceleration

Keeping the fluid level correct is critical in this unit to prevent failure at low mileage. The input section (bearings) is lubricated by a plastic trough and a rubber coated oil baffle. Pickup up truck models have three rubber plugs that seal the shift rails, it is very common for these plugs to leak, causing the transmission to overheat and fail, suggest you replace the rubber plugs with metal plugs.

The gear set on the right is from a F150 4WD transmission that was run low on fluid resulting in damaged input and cluster gears.

Ford Mazda M5R2 Hard to get into gear

The most common problem is failure of the 5th reverse syncro assembly/speed gear that is mounted on the counter shaft. This problem is caused when drivers do not let the transmission stop spinning before shifting into gear. 5th gear syncro rings are damaged and will fail. Problems with the shift lever have been observed the 3 Torx screws holding the shift lever plate can work loose and be lost. This can cause the spring and shim at the top of the shift lever ball to be damaged along with the shift bushing. MTC provide remanufactured top covers with forks to help solve problems caused by worn out shifting components.

Ford Mazda M5R2 Grinding going into gear

This problem can be caused by excessive wear sides on shift forks, especially on transmission with iron forks causing fork and slider to operate in correctly. Some problems have been reported with 2nd gear shifting is-
sues, generally this is from excessive shift pivot seats wearing, and the seats are usually shot as well as the shifter seal. Midwest Transmission Center can provide a shift tower repair kit to help you solve this problem.

**Ford Mazda M5R2 Popping out of gear**

Worn or incorrect installed syncros can cause this problem, be sure to make (clock) the syncro assemblies at disassembly in order to reassemble in the right location and correct position.

**Ford Mazda M5R2 Will not shift from gear to gear**

This is a problem generally caused by shift forks moving on shift rail due to damage or extensive wear, new fork will fix this problem, inspect the shift rails to confirm wear, and if there is excessive wear on rails they should also be replaced. We recommend Ford Mercon ATF in this series Ford transmission.

Get your M5R1 and M5R2 rebuilt units or overhaul kit and hard parts from Midwest Transmission, you get the correct parts and save money; getting quality parts the first time. If you need M5R2 parts and purchase the parts from Midwest Transmission Center and need help just call the Drivetrain Expert 1-888-834-2012 it free, we have the answers you need. For more information see [www.midwesttrans.com](http://www.midwesttrans.com)