



MERCHANT AUTOMOTIVE



Merchant Automotive #10001
Transfer Case Pump Upgrade Kit 1998-2007
Installation Instructions

INTRODUCTION:

By following along with these installation instructions you should be able to easily install the Merchant Automotive Transfer Case Pump Upgrade Kit in your transfer case. First and foremost, be sure to practice safe shop techniques especially when working in, around and under your vehicle as well as with power tools and equipment. If after reading through these installation instructions you feel that the task is beyond your mechanical skill level we strongly suggest that you have your local diesel performance or off road shop handle the installation for you. They have the tools, knowledge and skills to perform the installation and get your truck back on the road quickly and safely.

Before we dig into the actual installation, let's briefly discuss the problem with "pump rub" and the MA solution. The transfer case in your 1998-2007 Cadillac, Chevrolet or GMC pickup, SUV or van may be in the slow process of self-destructing without your knowledge each and every time you drive your truck. The following GM transfer cases are at risk: NP136, NP149, NP236, NP246, NP261, NP261HD, NP261XHD, NP263, NP263HD and NP263XHD. They are found in four wheel drive vehicles including 1998-2007 Silverado/Sierra 1500, 1500HD, 2500, 2500HD and 3500, 1998-2003 Blazer/Jimmy, 1999-2005 Astro/Safari, 1999-2007 Escalade, 2002-2007 Avalanche and 1998-2007 Suburban/Yukon XL/Tahoe/Yukon 1500 and 2500 models from Chevrolet, Cadillac and GMC. All of these transfer cases rely upon an internal pump to deliver vital lubrication to the planetary gears and drive sprocket sleeve. The pump is driven by the main shaft requiring the pump housing to "float" inside the rear half of the housing. It is indexed and held securely with tabs to maintain the proper position in the transfer case.

The transfer case housings are made from lightweight magnesium while the internal pump is made from aluminum. A spring steel anti-rattle clip is used to mitigate pump movement inside the transfer case, but unfortunately over time the clip can fail and/or wear through causing the tabs of the pump to make direct contact with the softer magnesium case which can and will eventually wear a hole through the rear housing causing the vital lubrication to leak out of the case. Obviously, the gears and bearings inside the transfer case can be damaged if the vehicle is operated without fluid in the transfer case. To make matters worse there is no dipstick or low fluid indicator and a transfer case with a pump rub failure typically leaks while the vehicle is in motion with little to no leakage when parked so it is not uncommon to have an empty transfer case with no visible signs of the leak on the driveway or garage floor. Rebuilding the transfer case with new original equipment parts will be a short term fix as the pump rub issue will almost certainly happen again over time with the rebuilt unit, likewise replacing the transfer case with a used or even new case is also likely to run into the pump rub issue later on down the road.

MERCHANT AUTOMOTIVE SOLUTION:

To eliminate the possibility of the relatively sharp edges of the pump cutting or rubbing through the soft case the engineers at Merchant Automotive developed their Transfer Case Pump Upgrade kit. The basic kit consists of a CNC-machined aircraft quality T-6061 aluminum pump body machined with precision tolerances of less than 0.0001-inches to ensure proper fit inside the transfer case, along with a new transfer case adapter gasket, RTV silicone and blue threadlocker compound. **(NOTE: This upgrade kit *MAY NOT BE COMPATIBLE* with some aftermarket aluminum rear transfer case halves due to the inconsistent manufacturing tolerances seen in them. Please be sure to verify fitment before installing.)** Kits are also available with Merchant Automotive Performance Transfer Case Fluid, Magnetic Drain Plugs, rear case halves and even seal drivers as options; to see the optional kits.

The MA Pump Upgrade features larger indexing tabs that prevent the pump from rubbing or cutting a hole in the transfer case housing. It is easy to install once you have removed the transfer case from your vehicle and backed by Merchant Automotive's Limited Lifetime Warranty against pump rub provided that your rear housing does not have an existing hole or if you have replaced the rear housing with a new one.

INSTALLATION:

These installation instructions start with the transfer case removed from the vehicle since it focuses on the actual pump upgrade installation. Please consult a service manual for steps required to remove the transfer case from your particular vehicle. An overview of the removal process would be to drain the fluid into an appropriate catch pan, disconnect both drive shafts and disconnect the linkage and/or unplug the wiring harness. Then support the transfer case from below and remove the mounting bolts securing the transfer case to the output adapter on the transmission tail housing. Finally lower the transfer case from the vehicle and bring it to the work bench for the pump upgrade installation. In addition to these printed instructions you can view a video following along with the proper procedure on the Merchant Automotive YouTube channel.

TOOLS REQUIRED:

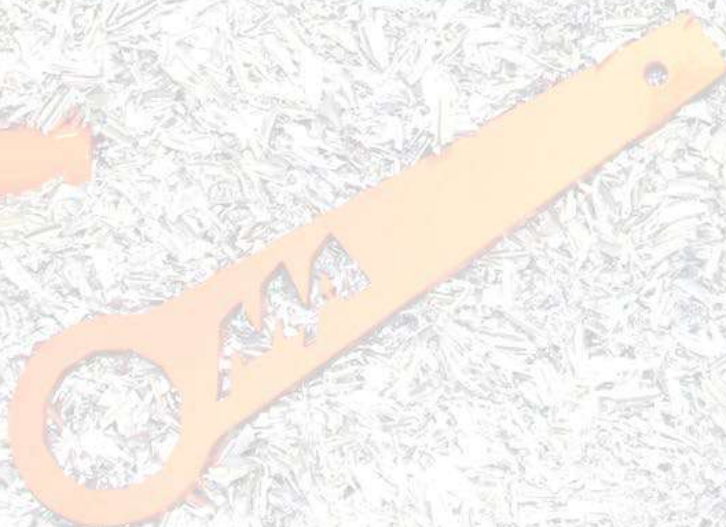
- Large flat head screwdriver or similar pry tool
- Small flat head screwdriver or similar pry tool
- 10mm and 15mm socket and ratchet
- 18mm wrench or socket for the drain plugs
- 19mm or 3/4-inch box end wrench or deep socket
- Snap ring pliers
- T15 Torx screwdriver or bit
- Torque wrench



Taller tabs for greater contact area.

01 The differences are quite obvious between the upgraded Merchant Automotive pump body over the stock unit. The MA part is CNC-machined from aircraft quality T-6061 aluminum with precision tolerances of less than 0.0001-inch. The larger tabs provide more surface area on the case to virtually eliminate rub through.

02 This image shows the inside of a transfer case with a pump rub leak. Also visible in the image is the anti-rattle clip designed to keep the pump from rubbing on the rear housing. Notice that it is worn completely through the steel and into to magnesium case. You can also see the small pin hole that is the greatest problem of all. The fluid will slowly leak out through that small hole causing the slow death and destruction of your transfer case. Be sure to remove the anti-rattle clip and any of its pieces, if it has broken, to prevent additional damage inside the transfer case after it is reassembled.

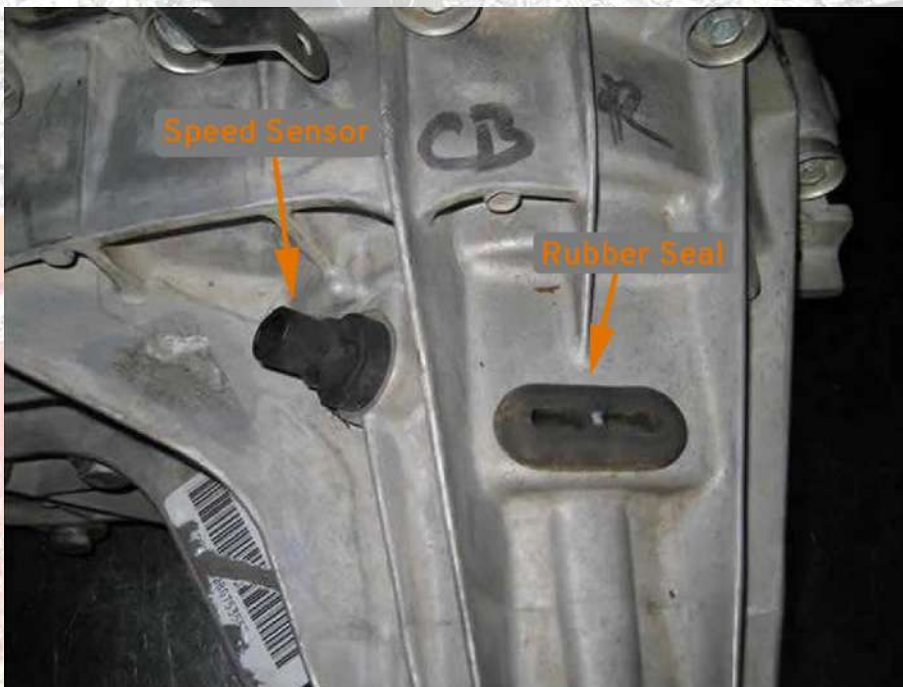
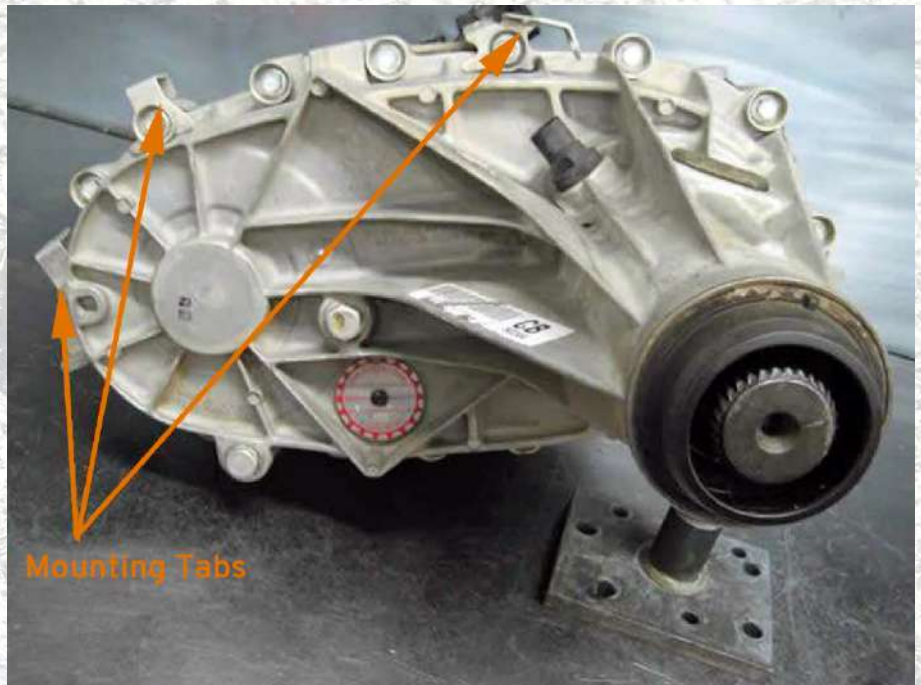


03 The highlighted box and arrow shows what is typically seen on the outside of a transfer case that has experienced rub through. Also notice the grime buildup from the fluid leaking and catching road debris while driving. This hole is pretty obvious but in a difficult to see location when the transfer case is still installed in the vehicle, however you may start noticing oily buildup toward the back of the truck and underside of the chassis. If your case is worn through you can replace it with a new case half available from Merchant Automotive. The Merchant Automotive Limited Lifetime Warranty against pump rub only applies if the original case is not worn or if it is replaced with a new case half if it was worn through.



04 The Merchant Automotive Transfer Case Pump Upgrade kit includes the following items: CNC Machined Pump Housing, Tube of silicone sealer with applicator nozzle, transfer case adapter gasket, and Blue threadlocker.

05 Be sure to take note of the position of the mounting tabs and brackets on the housing. Use the image for reference upon reassembly to ensure they all go back in the proper position, or take a picture of your particular transfer case before disassembly with your smartphone or tablet. There is a series of bolts with cup-washers around the perimeter of the case. The perimeter bolts are all 10mm hex head with the exception of one that uses a 15mm hex head as it is also a bracket mount bolt.



06 Viewed from the top of the transfer case you will find the output speed sensor as well as a rubber plug.

07 Start by using a flat head screw driver or similar pry tool to pry the plug out of the case.



08 You will see a snap ring under the plug as shown.



09 Next use a 19mm or 3/4-inch box-end wrench or deep socket to remove the speed sensor. **DO NOT** use an impact gun, on the speed sensor, it is plastic and will break.

10 You can see the reluctor wheel inside the case once the speed sensor is removed.





Step 2:
Pry main shaft toward
front of transfer case

Step 1:
Spread clip apart
and hold for step 2

11 Using snap ring pliers and a large flat blade screwdriver or pry tool, open the snap ring then gently pry on the reluctor wheel pushing it forward toward the front of the transfer case. This will release the rear support bearing from the rear case housing.

12 Make sure that the bearing is free of the snap ring completely. Then remove all the perimeter bolts from the transfer case making sure to note where the mounting tabs and brackets are located.



13 Gently pry the case halves apart with a large flat blade screwdriver or similar pry tool in the recessed notches on each side of the transfer case as shown.

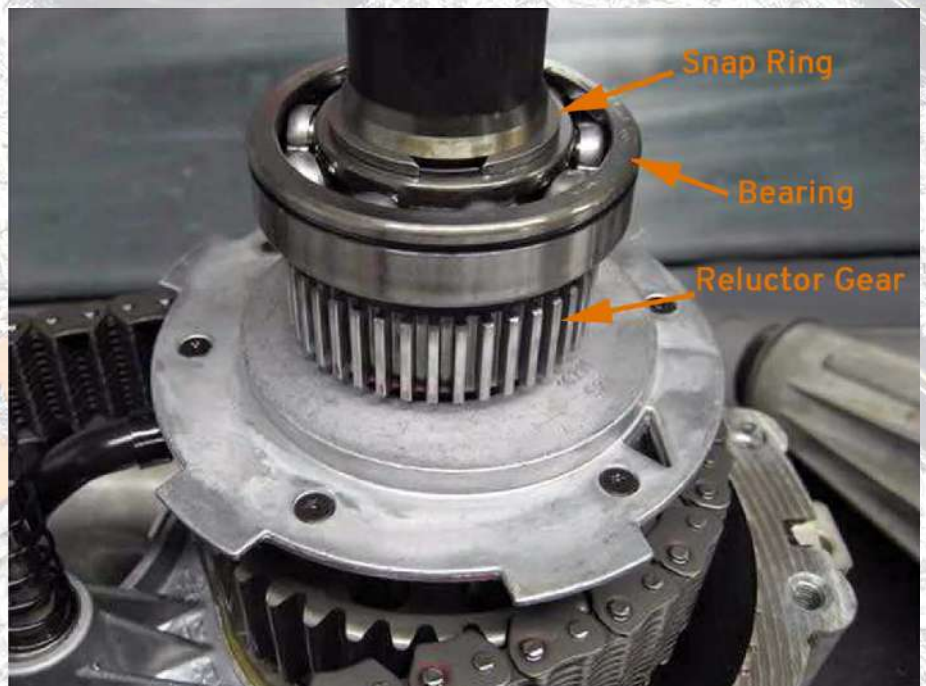
14 Separate the transfer case rear housing by pulling it away from the rest of the case. At Merchant Automotive, we find it easier to work on a transfer case by propping the unit in an upright position as shown.

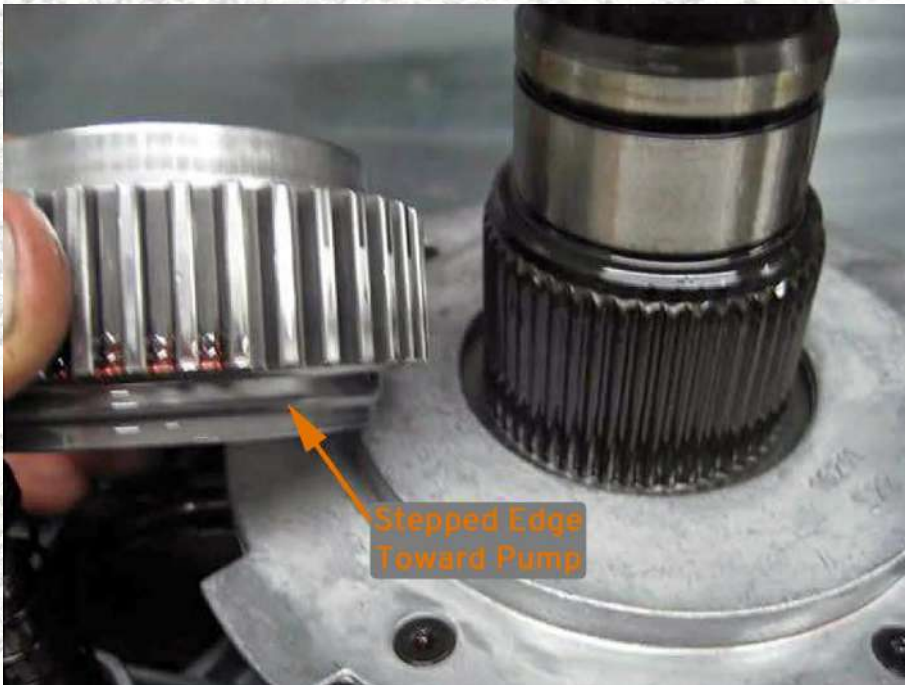


This anti-rattle clip is in good condition. BUT it still must be discarded!!!

15 Hopefully this is the condition of your anti-rattle clip and no damage has been done to the rear case half. The one shown here was in excellent shape and shows no abnormal signs of wear. **NOTE: The anti-rattle clip must be removed and discarded regardless of its condition as it is no longer necessary and cannot be used with the Merchant Automotive Transfer Case Pump Upgrade kit!**

16 This image shows a closer look at what you will see inside the transfer case. The snap ring holds the bearing on the main shaft. Using snap ring pliers, remove the snap ring by expanding it just enough to slide it up and off the shaft. You should then be able to lift off the bearing, it is a bit of a snug fit but a little wiggling is all that is typically needed to remove it provided the bearings and shaft were not damaged from lack of lubrication.





17 After the bearing is removed slide the reluctor wheel up and off the main shaft. Notice the orientation of the wheel, there is a stepped edge on the lower side of the wheel that **MUST** be reinstalled toward the pump.

18 The orange box in this image highlights where the oil pump pickup slides into the pump body. This is easily removed by simply pulling it out of the pump. The pickup tube can stay in the case after sliding the tube out of the pump.



19 Here is the stock pump assembly removed from the transfer case for the upgrade installation.

20 Take note of the O-ring seal in the pump that seals the pickup tube. This O-ring must be in place during reassembly; it may be easier to assemble if you carefully remove the O-ring from the pump and install it on the pickup tube before reinserting it into the transfer case pump during reassembly.





21 Using a T-15 Torx screwdriver or bit remove the six screws holding the pump together. This image shows a disassembled view of the pump. Clean and dry all parts. The pump body may be discarded, (*top plate of the pump only, the gear set, screws and bottom will be reused*), as it will not be reused.



22 Place the MA pump upgrade with the tabs facing up on the work bench then load the gears into the cover. After positioning the gears as shown, place a few drops of oil on the gears to help with the initial lubrication.



23 Use the supplied blue threadlocker to apply a small drop on the threads of each of the six screws that hold the pump together as shown.

24 Reassemble the pump, first starting each of the screws by hand a few threads then draw them tight in a crisscross pattern to ensure that the housing draws together evenly. The screws only need to be snugged; do not use excessive force to tighten them. Torque should be about 80 in-lbs, with a good rule of thumb would be to tighten them with a screwdriver type driver handle firmly. After tightening, verify that the pump gears still rotate smoothly in the housing.





25 Begin to reassemble the transfer case by reinstalling the pump, reductor wheel and support bearing on the main shaft followed by the snap ring. (Verify that the stepped edge of the reductor wheel is facing the pump and that the snap ring groove in the bearing race is on the top side of the bearing as shown.) Then reinstall the pickup tube in the pump housing making sure that the O-ring is intact and properly positioned.

26 This image shows what the inside of the transfer case should look like after reassembly. Verify that the spring is placed on the shift shaft as well.



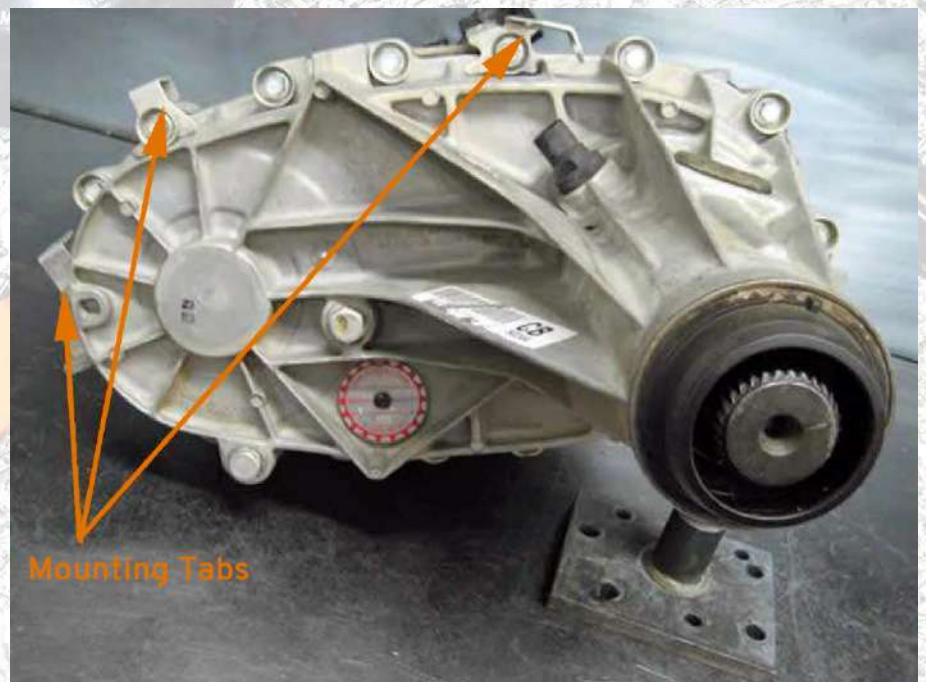
27 Locate the dowel pins (they could be in either half of the transfer case housings) and place them in the front half of the transfer case. One dowel pin is required on each end of the transfer case; the location is identified by the counter bore in the case half. **BOTH** of the dowel pins **MUST** be installed or severe damage to the transfer case could occur.

28 Cleaning the old silicone sealer off the case halves is actually pretty easy. Use a rag and simply scrub it off as shown in the image, you may also use a red Scotch-Brite pad to clean the case halves and remove the old silicone. Notice that the flange has a rough surface finish; this is intentional to promote a good bond with the silicone sealer between the case halves. Thoroughly clean the flanges with brake cleaner or a similar product to remove all oil and residue. Silicone will not seal properly if any oil or residue is present. Failure to ensure the area is completely clean could result in a leak.



29 Use the supplied silicone sealer with the applicator nozzle and apply a 3/16-inch wide bead of silicone sealer around the perimeter of the case in the center of the sealing surface flange. It is not necessary to go around the bolt holes; apply the sealer to the inboard side of the bolt holes as shown.

30 Reinstall the rear housing then install and tighten the housing bolts using a crisscross pattern, being careful not to overtighten them. Torque each bolt to 27 ft-lbs. Do not forget to reinstall your mounting brackets as shown.





Step 2:
Pry main shaft into position, locking the bearing into the case

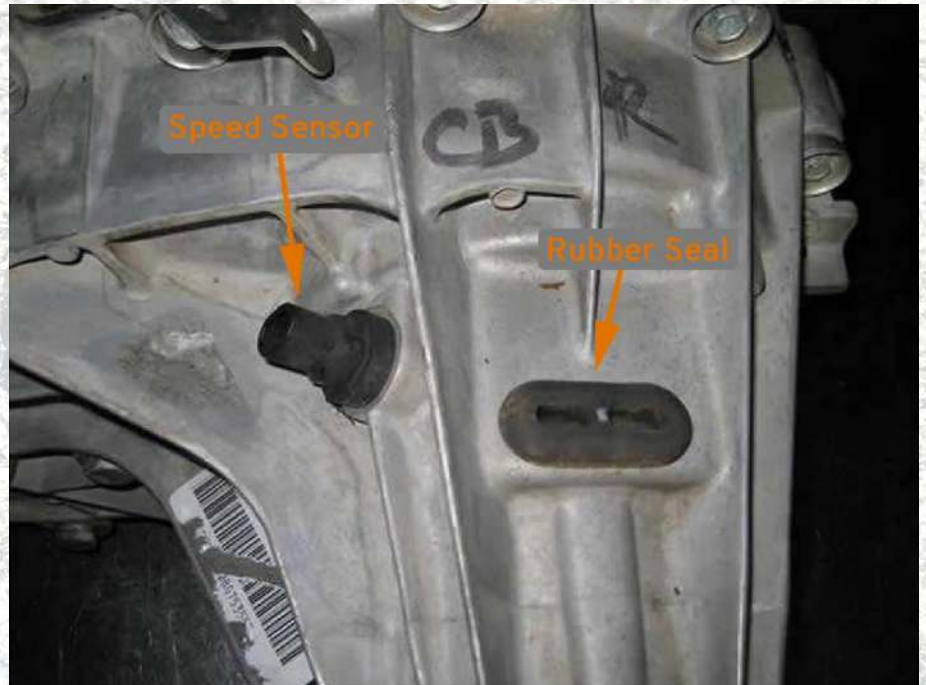
Step 1:
Spread clip apart and hold for step 2

31 Spread open the snap ring through the access hole in the rear case half while using a large flat head screwdriver or similar pry tool to slide the mainshaft support bearing into place locking it into the rear case housing.

32 Visually verify that the snap ring is locked into place in the bearing and in the case housing.



33 Reinstall the speed sensor and rubber plug. A small amount of the silicone sealant can be applied to the threads on the sensor as well as around the rubber seal for a tight leak proof seal. To complete the upgrade, reinstall the transfer case drain and fill plugs. For additional protection we recommend using the Merchant Automotive [Transfer Case Magnetic Drain Plug Kit](#) on your rebuilt transfer case.



COMPLETION:

Congratulations! You have successfully upgraded your transfer case and prevented any rub through ever again. Carefully reinstall your transfer case in your vehicle following the reverse procedure for removal. Then refill the case with 2 quarts of Merchant Automotive [Performance Transfer Case Fluid](#) or high quality ATF. We recommend changing the fluid once a year to ensure a long and healthy life for your transfer case.



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Learn more about performance driveline and axles we have.