

SEALING TRANSMISSION SHIFT RODS

BY TOM SOPCHAK

If you are like me, you don't care for the transmission oil leaking on the garage floor, over your engine or wiring. Others have shown how to seal the bearing that goes through into the bell housing, but what about the oil that gets out around the shifter rods?

The gear shift *levers* attach to gear shift *rods* that go through the side of the transmission case. The gear shift rods slide through Oilite bushings that are pressed into the transmission housing. Oil splashes up onto the gear shift rods and the oil ends up running down the rods and out of the case and all over the side of your engine area. There is nothing inside of the bushings to keep the oil in the transmission. Here are two ways to correct this situation: Method One adds O-rings inside the bushings, Method Two add seals to the transmission case. Both of these methods were devised by others; I am grateful for their expertise.

Ok, I will tell you up front that the space inside the tunnel is very limited. I do not know if you will be able to utilize either upgrade to fix the trans oil leaks without removing the driver's side of the tunnel. The alternative is to remove the transmission. In method 1 you need room enough to remove the gear shift slide rods; with method 2 you have to have room enough to insert a tool over the ends of the gear shift slide rods.

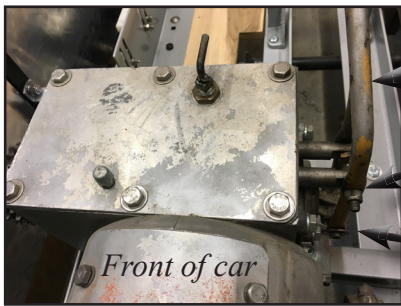
Method One: replace the Oilite bushings with ones having O-rings

The original Oilite bronze bushings that your gear shift rods go through have a smooth internal bore, left bushing below. You need to have a groove turned into new bushings to accept O-rings. The bushings are 0.812"OD x 0.625" ID x .75" long. The Oilite part number is AA810-10B, the McMaster-Carr part number is 6391K253. Groove is 0.723" x 0.085" wide O-ring size is 01-016

You will note that I had 2 grooves machined into the bushings on the first set I had done, right bushing in photo. The idea here was to have an O-ring that keeps the dirt and dust out, and a second O-ring that keeps the oil in. After installing one with double O-rings I felt the drag on the shift rod was too great and I removed one (the outer) O-ring.



Transmission cover with 6- 3/8"bolts. You need to remove the cover for this method. The cover holds two springs in place, so be aware before taking it off.



2- gear shift levers that need to be removed. The gear shift levers have threaded holes, and the top bolts are threaded through so be careful.

2- 5/16"bolts with 1/2"nuts The nuts need to be removed and the bolts need to be backed out of the gear shift levers in place.

Smooth bolt with 4 washers and a single cotter pin holds the bottom of both shift levers. Make note of where the washers are and put them back in the same positions during re-assembly.

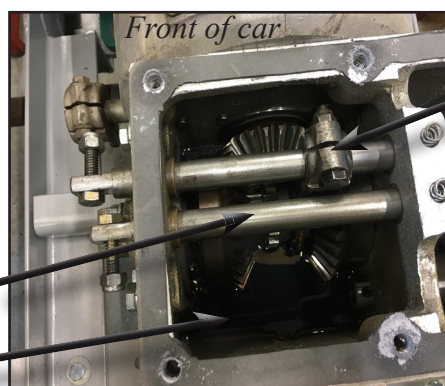


Shifting levers have been removed. The gear shift rods are going through the bronze bushings and into the transmission case.

A gasket seals the transmission cover to the housing. If damaged, it will need to be replaced.

Rear, longer shifting rod selects High or Low gear ratio

Inspect and change your oil?

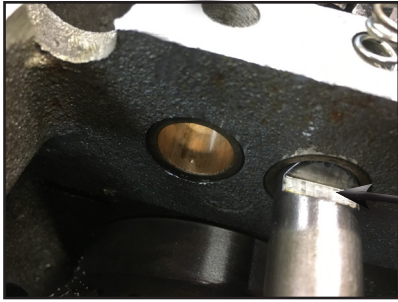


Front, shorter shifting rod that controls forward or reverse gear selection. You will need to loosen this nut and bolt to remove the forward/reverse shift rod.

CRITICAL:

Don't lose these two springs or the small balls under them. They fit into detents in the shifting rods and hold the transmission settings.

Hole for ball and spring



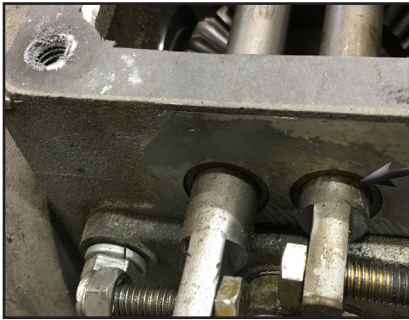
There is a ball underneath this spring

Before you remove the shifting rods, be SURE to get the 2 springs and 2 small balls out or catch them when you slide the shifting rods out of the transmission case

Detent in shifting rod. The small ball sits in this detent to hold the rod's position



View from outside of transmission case



These are the 2 Oilite bronze bushings that need to be replaced

View from inside the transmission case.



You will need to remove the gear shift rods. That means loosen the clamp nut/bolt inside of the transmission housing and slide the gear shift rods out of the transmission. BE CAREFUL not to lose the ball and spring for each of them. Once you get the gear shift rods out of the bushings, you'll need to back the bushing out. I used a simple flat head punch and hammer. They backed right out. You could use a press or a bolt with nut and some fender washers in place of the punch. Up to you. You do NOT want to damage the new bushings that you are installing. So, pounding on them and flattening the edge out is not a good idea. You want to make sure you don't cause damage while installing them.



High/Low gear shift rod removed. Be VERY careful to avoid dropping any parts or debris into the transmission.

Original bushing- no O-rings

New Oilite bushings pressed into the case.

You can see there are two O-rings. I later ended up removing the outer O-ring as I felt it added too much drag.



Once the new bushings are installed, slide the gear shift rods back into the housing and into their associated clamps. This groove is for the bolt that goes through the clamp that squeezes and holds the shifting rod. Tighten back in place. (I'm showing the shifting rod aligned to the hole in the clamp. This rod will be inserted into the clamp and bolts.)



Detent in gear shift rod that the spring-loaded ball falls into when shifting. It is what provides the feeling of shifting and it holds the position.

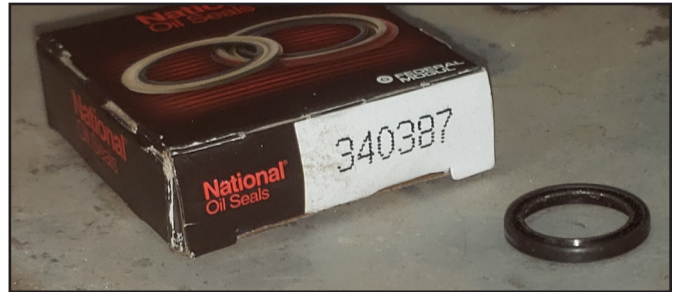
Put everything back and you're all done.

Method 2: install seals in the transmission case for the shift rods.

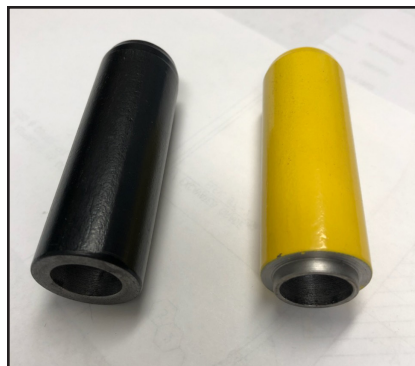
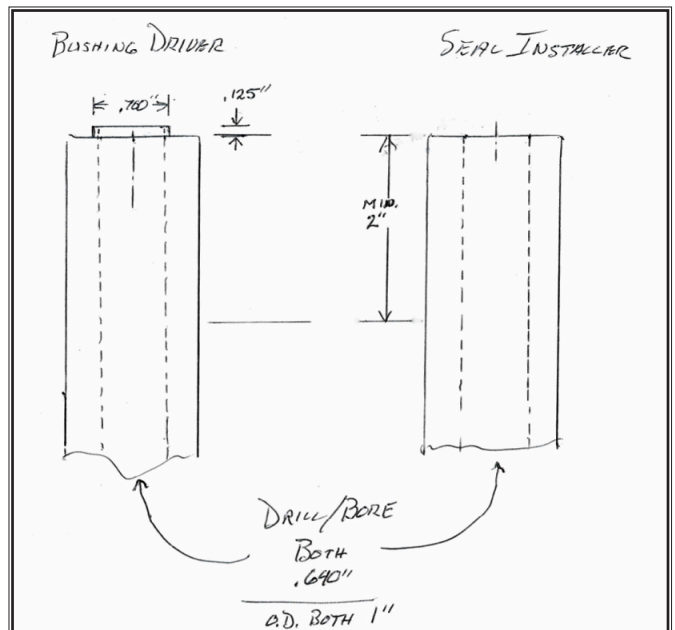
One advantage of this method of sealing the transmission shifting rods is that you don't have to remove the cover from the transmission or the shift rods. If your bushings are badly worn, they should be replaced otherwise the seals might not work. There's not a lot of flex in the seal lip due its small size. If you remove the shift rods to replace the bushings, please re-install the shift rods prior to installing the seals. If you insert the shift rods after you have installed the seals, you might catch an edge of the shift rod on the seal and rip it.

There is plenty of room inside the case for the additional 1/8" of bushing that will be inside the case. The case wall is about 9/16" thick. Driving the bushing inside the case will leave 7/16" of the bushing still in the case wall.

The suggested seal is National (Oil seal) part number 340387. You will need a pair of these; one for each shift lever.



This sketch shows two simple tools created by Dave Johnson. Mind you that these are NOT required to install these seals, but they sure make the job easier. The 0.640" drilled or bored hole in the center of each tool allows them to slip over the gear shift rods. They also provide great alignment to the hole in the transmission case.



On the black Seal Installer, the wide, flat surface fully contacts the seal so there is nearly equal pressure on it as it is driven into the bushing space. This face will also contact the case and prevent you from over driving the bushing inside the case.

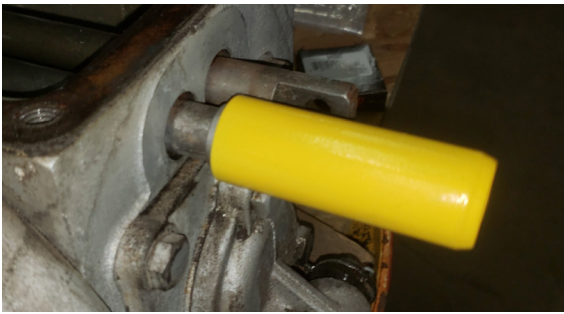
On the yellow Bushing Driver, the 1/8" step controls the depth that you drive the bushing back inside the case. It provides exactly the right amount of space to install the seal.

Disconnect the shift levers at the shift rod outer ends and lift the levers out as described in Method One.

Clean the transmission case around the bushings, don't miss the debris that will be below the rods (on top of the bearing retainer). There's not much room between the rods and the retainer, so if it's dirty the installer tools won't seat properly. Make sure all debris is removed around the shift rods. The two tools must slide of the shift rods and fully seat on the side of the case.

Check for and remove any burrs on the shift rods caused by worn lever pivot bolts; a sharp edge might damage the seal lip. Slide the flat ended (black) tool onto each rod and make sure it slides all the way to the case and doesn't hit the retainer below. This is just a check to make sure everything fits and seats as it is supposed to.



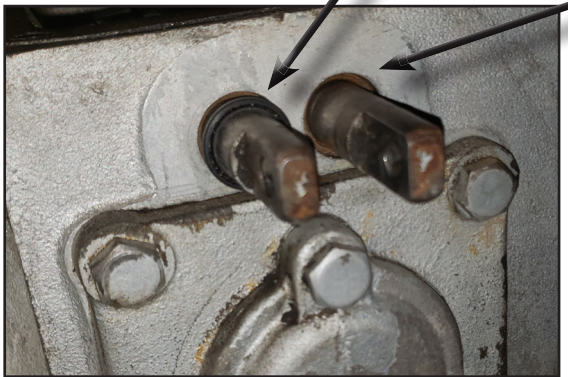


Using the bushing driver/spacer tool (yellow), slide the end with the 1/8" step over one of the shift rods. Using a small hammer drive, the bushing into the case until the shoulder of the tool hits the case. This doesn't require much force so take it easy. The bushing will be inset about 1/8" on each shift rod, creating a space for the seal. If you are using a socket or other device, drive the bronze bushing only 1/8" inside the case.

This is a view of what it looks like inside the transmission case after the bushings have been moved 1/8" inward.



Note the seal on the shift rod prior to being seated.

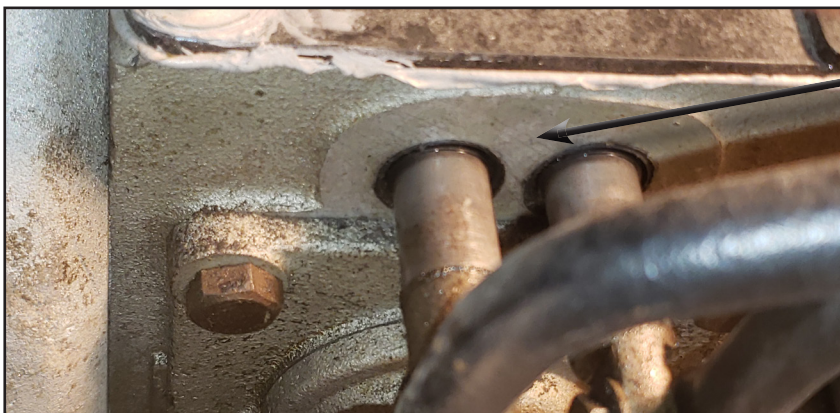
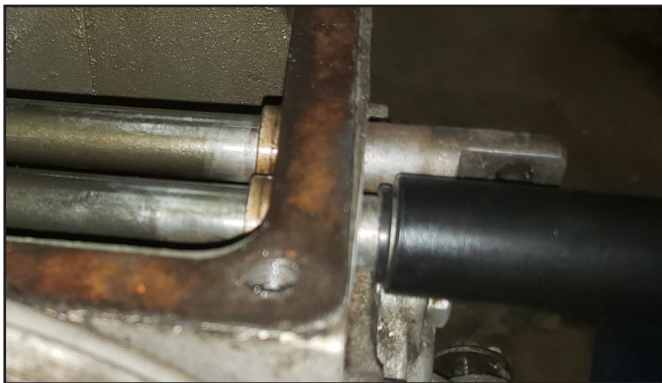


You can see the 1/8" space in the bore of the case where the seal will be located.

Since there is no pressure in the case, install the lip of the seal face out, it will act as a wiper/scraper to keep dirt out. Put a little lube on the seals (Inner Diameter (ID) and Outer Diameter (OD)) and slide them onto the shift rods. Slide them up to the side of the case.



Using the seal installer (black), slide the end with the hole over the shift rod and use it to seat the seal into the space you created with the spacer tool. The end of the installer tool is flat and should distribute the installation pressure equally on the seal. With the seal against the case and the tool against the seal, give a couple light taps with a hammer until the tool hits the transmission case. The seal should be in the 1/8" space in the case, and flush with the outside of the transmission. The National (brand) seal is rubber-covered and requires no gasket sealer/adhesive to keep it in place.



Both seals have been installed and fully seated within the wall of the transmission case. All that's left now is to reinstall the shift levers and the work is finished

It's up to you to choose the way to stop oil from leaking out your shift rods. Either way, get it done and go for a ride!