

# Borg Warner R10 Overhaul Instruction

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Due to printing constraints concerning color pictures, the above web site may have clearer pictures than offered herein. Other than that, the text was taken word for word. Many thanks to the author for taking the time to document his work!



## Rebuilding the Borg Warner Overdrive Unit

There's two versions of this transmission. One has a light built SM-318 otherwise known as the Muncie, and the SM-326, otherwise known as the Saginaw 3 speed. The Saginaw is a much heavier built unit, and has all helical synchronized gears except reverse. The overdrive unit on a Saginaw box is a R10Q-1 instead of the R10H-1A. The only difference is the shorter tail shaft to offset the larger main transmission. Ratios: First-2.85:1, second-1.65:1, third-1:1, and overdrive-0.85:1. The overdrive unit is actually two transmissions back to back. The front box is one of the above mentioned boxes, and the back end is a two speed overdrive box.

This page is intended for someone who needs to get inside the overdrive unit for whatever reason. There are a few tricks to be aware of when taking it apart, and when reassembling. Hopefully, these photos and text will help the rebuilder avoid otherwise unforeseen problems. The unit on this page is a very good unit. I disassembled the overdrive unit and the main transmission for inspection before installing it in my '65 Suburban.



The first step is to remove the freewheel clutch lockout taper pin. If you forget, the case won't come apart due to the linkage inside. Remove the lockout lever too.

Remove the 5/8" and 1/2" bolts all the way around. Then... STOP!!! Read the next panel



>>>————> DON'T let the case next to the transmission come apart! Note in the picture where the crack is starting. If the center section slides out, the bearing pins in the main shaft of the transmission will fall out! Hours of extra work if they do!!



The rear case removed. This is the center section, and contains the rear bearing, linkage, solenoid mount, and gear assy for the overdrive. The transmission's main shaft is part of this unit, and it takes the place of the rear tranny case on a non-OD unit.

The rear section contains the ring gear, rear bearing, speedo drive, governor switch, and clutch lockout linkage. Beware the spring in the hole in the right side. The lockout linkage fits in the hole, and the spring keeps forward pressure on it. Don't let it fly out and get lost!!



This is looking into the clutch hub and ring gear. There is a stepped section that's rough in the first part of the center's machined smooth section. Don't panic. This is normal, and it helps the clutch pins slide in during re-assembly.

Remove the U-Clip from the end of the shaft. Slide the planet gear set and lockout linkage off as a unit.



The bigger U-Clip holds the clutch assy. This is the planet set and lockout linkage from another angle. The clutch is removed in this shot.

This is the sun gear after the planet set is removed. Remove the reverse lockout pin also. It sits behind the lockout linkage rod assy.



Remove the big snap ring to release the splash guard and linkage face plate. The solenoid locking gear and slide block resides in here.



This is all the parts laid out in order of assembly. The big pin is the reverse lockout rod. Without it, the free-wheel clutch would spin out in reverse, and the truck won't move.



These are the clutch pins that fall out as the rear case is removed. There should be twelve of them. If not, get down on your hands and knees, and start looking!! You'll need 'em all!!

The freewheel (one-way) clutch. Note the ramp shapes on the hub. The rollers ride up the slope and jam the inside of the center part of the ring gear section under torque. They roll down as the truck rolls forward letting the engine idle.





This unit didn't have oil drain plugs. Typical 1970's Save-A-Buck thinking. The castings are there, so we drilled them for a 1/4" pipe plug fitting. The choice is yours. Do it now, or lay underneath with a turkey baste bulb later while trying to suck out the old oil!

Tapping out the hole with a 1/4 pipe thread tap. It has a drain plug NOW!! Make sure every speck of tap-debris is flushed out of the case and rear bearing. Most units already have the oil drains, however. If yours does, yeehaw! Move on to the next step.



Assemble the clutch onto the planet set. It's a bit tricky to get the big U-Clip snapped on again. Having help is great.



This is overdrive position. The solenoid pushes the block in, and it sits with spring pressure until the next slot comes around. The sun gear locks up, and the planets spin around it, and inside the ring gear causing about a 27% increase in output shaft speed.



In direct, the solenoid lets the block slide out. The sun is released and tries to spin in the planets. This causes a lockup of the planet set, and the sun, planets, and ring gear spin as a unit. The shift rod lets the sun slide back into the planet case so it locks solid for direct.



This is the shift rod in overdrive position. The groove in the sun gear lets the planet cage spin past.



This is the shift rod in direct position. It puts the gear into the planet cage to lock it up.



Put a couple of bolts in the center section, and leave the heads out about 1/2" - no more than this to keep the tranny's main shaft bearing pins in place. Work gasket sealer in the edges here using a screwdriver.



Assemble the solenoid block and locking gear with the C-Clip spring facing out. The snap ring needs to be under the notch in the splash guard first, or you will fight it. Watch the angle of the solenoid slide block. It should match the slots in the locker.



Slide the sun/planets/clutch on while holding the shift rod in the sun gear's fork groove. It will take three hands for this one. Don't forget to put the reverse lock-out rod in it's hole first. You will have to use heavy grease to glue the clutch pins in place. Apply sealer to the case mating surface now.



Remove any bolts, and carefully slide the rear case onto the unit. Help here is good. Have the helper turn the yoke to get the gears lined up as it goes together. The linkage rod slides into the hole with the spring. make sure the notch is facing down on the rod, and the spring is in the center of the hole. If you hear a clutch pin drop and hit the case, start over again.

Put the lockout lever in, and after checking to see if it works the rod, tap the taper pin in. The lever is in the overdrive position here. Flipped forward is the lock-out position. The yoke should turn easy one way with the lever flipped towards the rear, and turn the tranny shaft when spun the other way.



Install the solenoid by rolling the tranny upright to slide the block down. Twist the solenoid as it's put in to lock the ball to the slide block notch inside. Hold the solenoid in with pliers to test the overdrive shifting. Put the tranny in direct, and spin the input shaft. The output should spin faster when it locks in.

Gotta make it look nice. Good ol' Chevy orange looks clean, and the engine paint practically sticks to anything.



**Ready to Install! Don't forget the oil!!!**

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