

## **Rover SD1 - GM180 Automatic Transmission & 5 Speed Manual Gearbox Solutions**

I think it's fair to say that the key elements of this essay are mostly the result of original thought (not to say that other people hadn't thought of them too, but I had not previously heard of most of them).

Frequently we are reminded - "Top up the gearbox". It's easy to say, isn't it? Not so frequently we are reminded - "Drain the gearbox ---, etc" and don't they both fill your head with dark thoughts. Here are a couple of ideas that make things really easy.

### **Fitting Drain Plug to GM180 Auto Box**

Time will come, eventually when you have to remove the oil pan of a GM 180 automatic box for cleaning, maintenance or just straightforward fluid replacement. Even the most skilful owners will suffer a flood of transmission fluid. My VDP Auto box didn't have a drain hole so any oil changes (however infrequent) would always involve pan removal and the inevitable mess, but not any more!

- With the pan removed and cleaned, I braised an 8mm steel nut onto the lower rear edge at a 45-degree angle, so that the bottom of the hole was level with the bottom surface of the pan.
- I then carefully drilled out the blinded hole and ran a matching tap through the nut to clean up the threads, followed by cleaning off the burrs and any residual swarfe.
- A short 8mm bolt and copper (or fiber) washer completed the modification and all future fluid removal is now completely straightforward with less risk of a mess.

### **Refilling a Manual Gearbox**

- When topping up or refilling a manual box, the oft recommended method using squeeze bottles and flexible pipes has the disadvantage of proving Newton's 2nd Law of gravity that states: "It's easier to oil your armpit than to fill a gearbox from below!"
- A neat method to refill or top up the gearbox is to run a large bore plastic hose from the filler hole, up past the bell-housing and into the rear of the engine bay.
- Fit and secure a suitable funnel on top and pour in the replacement oil without difficulty. Do it slowly to prevent overflow.

### **GM180 Auto Box Transmission Fluid Leaks**

Apart from the plainly obvious source of leaking transmission fluid, from the sump pan and gasket; there are three really awkward places a GM180 box can leak.

1. The filler tube seal
2. The kick down cable seal
3. The gear selector shaft

On a 3500 model, these are difficult to pinpoint and fix because the exhaust Y pipes mask access to the three problem areas. And it's only when the leaks get so bad that you have good reason to dismantle your exhaust system, right? Unfortunately there is little choice, I'm afraid, and when I tackled the problems I also removed the down pipes which were being replaced anyway.

### **1) The filler tube seal**

- a. If you haven't already drained the box, be prepared for some oil spillage and remove the filler tube and its top hat seal. Inspect the seal and replace if necessary.
- b. Mine was reasonable so I used a trace of silicon instant gasket and refitted the seal and tube.

### **2) The kick down cable seal**

- a. Disconnect the gear selector rod from the selector arm. Mark the radial position of the arm and gearbox inhibitor switch for accurate re-assembly. Remove the arm and switch complete with its brackets.
- b. Remove the forked plate that retains the kick down cable and disconnect the other end of the cable from the throttle assembly also.
- c. Withdraw the kick down cable from the transmission and note the condition of the "O" ring on the plastic tube. It's probably flat!
- d. Replace it with a suitable new ring. Note that for extra sealing potential I also positioned a slightly larger diameter; very thin "O" ring against the shoulder of the plastic tube. It's a neat dodge because it creates a second independent seal and also ensures that the plastic tube is a firm fit in its hole when the forked retaining plate is refitted.
- e. Re-engage the cable nipple and (using silicon grease or rubber lubricant) ease the tube and new inner seal into position. Replace the forked clamp pushing it tightly home.

### **3) The gear selector shaft**

- a. Inspect the selector shaft where it enters the box and note what type of oil seal is present. Mine had an "O" ring here but it was loose and damaged. Carefully clean

out the adjacent (fairly large) recess. Obtain an appropriate sized seal, but at the time, I could neither identify the correct or suitable seal so I came up with the following solution using concentric compressed “O” rings.

- b. From my box of a million “O” rings, I selected two different sizes, plus a fiber washer. The first ring fitted snugly on the shaft. A second, larger ring neatly fitted the outer diameter of the recess. The fiber washer was reduced in diameter to exactly fit the recess, thus pressing both rings firmly and concentrically together when the inhibitor switch was pushed back onto the shaft.
- c. Upon re-assembly of the lever to the shaft, tightening the retaining nut efficiently compressed the washer and two rings to create an effective and lasting seal. Silicon grease enhances the seal.
- d. Reconnect the selector rod and the kick down cable (at the engine) and refit the exhaust system. Make the necessary adjustments and top up the box with ATF according to the handbook.

The above procedures have effectively stopped all three annoying GM180 auto box leaks in their tracks for over six years. Strangely though, when the car is laid up for a long period (several months), there is a slight leak that drips on the O/S exhaust pipe near the heat baffle coming from the inner part of the filler tube seal. I believe this is because during lay-up, the torque converter releases all its fluid into the sump. The level rises quite high up the filler tube, thus generating a “head” of fluid that can gravitate past the top hat seal. It’s a smelly world for the first few miles after a lay-up.

### **Radical Cure for a Nasty 5 Speed Manual Gearbox (and a Differential Bonus too)**

- Here is a radical solution to an unfriendly 5-speed gearbox. My Vitesse used to have a truly nasty gearbox. It baulked at will and was notchy to a fault. In fact it was very, very hard work. This was my last resort.
- During a routine gearbox oil level check, I noticed how dirty the lubricant had become so it was obvious it had to be flushed and changed. It had the recommended ATF which Rover had been forced to specify, because the gearbox was unreliable when filled with conventional lubricant.
- By coincidence, I had been told by an Ex-Mobil employee that Mobil 1 or Castrol RS at 0W40 or 5W40 viscosity were considered by the trade to be a better replacement than ATF in the Rover 5 speed box and gave a much improved performance.
- With the car on axle stands and the back wheels off the ground I drained the box and re-filled it with a flushing mixture of 2:1 white spirit and ATF (I did say radical and it was a last resort!).

- With the engine running at idle speed only, I put the car through all the gears and let the drive train run off-load for 5 to 10 minutes.
- Upon draining the flushing mixture I was amazed at the filthy color and state of the drained fluid. It was as black as ebony with lots of sediment!
- I repeated the above with a clean batch of mixture to flush out the residues. One can imagine the washing machine action inside the box allowed the solvent component to reach into every recess.
- The box was then refilled with 5W40 "Castrol RS" (0W40 "Mobil 1" is virtually the same and I have subsequently used both with no discernable difference).
- I then added a recommended dose of Molyslip Gearbox Treatment. This stuff comes in a tube-like applicator and is available from Halfords, etc.
- The transformation was miraculous. It has run for over 8 years without any of the original symptoms and is a total pleasure to use.
- The oil has been replaced twice in that period with Mobil 1 and the same Molyslip gearbox additive each time.
- As an experiment I used the leftover Molyslip treatment in the Vitesse rear axle differential.
- After thoroughly warming the axle with an electric fan heater I sucked out all the old lubricant with a large medical syringe and some flexible plastic tube. It was then refilled with fresh hypoid oil (as specified) and the mentioned Molyslip treatment.
- The rear axle differential was transformed. Taking both treatments into account, the whole drive train has been silky smooth ever since. So good in fact, I treated my Vdp axle to the same deal.

### **Giving GM180 transmission the Elbow**

- At the rear of the GM180 transmission is a vacuum controlled actuator valve.
- This senses the vacuum condition at the engine intake manifold, and determines what action the transmission should be taking regarding gear change or kick down.
- The connection between the manifold and the transmission is made with a metal tube connected at each end with rubber elbows. Two things can go wrong.

- The pipe can be displaced from its retaining clips. And the elbows can be damaged or displaced.
- Either way, the integrity of the vacuum line can be breached.
- This in turn can have two extremely negative effects.
- The inlet manifold will receive unwanted air, which will definitely upset the idle speed mixture and in the case of an Efi system, might even stall the engine.
- The gearbox actuator valve will cease to function upsetting the gear change process.
- Check the integrity of both these little rubber elbows and replace if necessary. It may result in a transformation of performance.

So there you have it, a collection of gearbox and transmission related ideas that really worked for me. Perhaps they could work for you and transform the performance of your Rover SD1 too. If you decide to give them a try let me know how things work out.

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