Austin Healey 3000 Mk III BJ8 Overdrive Hydraulics
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The heart of the Laycock de Normanville overdrive is the hydraulic system. Inside the overdrive case is a small pump that is driven by a cam on the main shaft. The pump produces 450-500 psi of hydraulic pressure. If the system is not well maintained properly or contaminants or dirt are introduced during a rebuild the car owner is asking for trouble. Small dirt particles can foul and block tiny hydraulic passages in the system.

An important component in the hydraulic system is the accumulator piston and its housing (Figure 1). The piston and housing in the photograph were removed from my Laycock de Normanville overdrive hydraulic accumulator housing, piston with rings, and metal ring compression tool. The housing and piston show scoring from approximately 120,000 miles of use.

I have owned the car for 39 years and in all those years the overdrive has never failed. It has always has engaged and disengaged smartly when the OD switch was thrown or when I depressed the accelerator to pass a slower Ferrari or Jag. However, close inspection of these critical overdrive components during a recent tear down and rebuild of the driveline components revealed significant damage. In Figure 1 the scoring of the inner housing bore and similar damage done to the piston are obvious. Although I have routinely changed the oil and was careful to avoid introducing contaminants the accumulator items were badly worn. It was clear that new units were required.

Figure 1. My BJ8 overdrive after 118,400 faithful miles.

Note that the piston seen in Figure 1 has a series of metal rings located in a groove near the bottom of the piston. The piston and rings were purchased from Moss Motors as separate pieces and require assembly. There are a total of 6 cast iron rings. These rings are brittle and can break easily. Therefore the installation of the rings requires some care and finesse. The ring set consists of two wide rings which are installed on the piston first and line the bottom of the groove. These are followed by four narrower rings that rest on top of the two inner rings. The next step requires great care and patience, that is, inserting the ringed piston in the near zero tolerance of the accumulator

housing bore. It is necessary to compress the rings so the outside diameter exactly matches the inner diameter of the housing bore. It is also necessary to align the piston precisely in line with the longitudinal axis of the housing as the piston is inserted into the bore. Failing this will ensure a binding situation that can put stress on the fragile rings and may result in breakage. Trust me on this one.

When my gearbox/OD project arrived at this juncture I conducted a little research. I read the workshop manual and studied the overdrive material on John Sims' excellent website, www.healey6.com. Unfortunately, there was no description of a technique for the installation of the ringed piston into the accumulator housing. However, some automatic transmissions contain similar piston/housing components and face a like challenge during a rebuild. A visit to a transmission shop produced the small piece of tubing seem in the lower left corner of Figure 1.

The metal ring in the figure has an ID of 28.65 mm, slightly larger than the 28.45 mm bore of the housing. I used this ring to compress the piston rings and then to insert the piston and rings into the accumulator housing. The following process works well and minimizes stressing the fragile rings. First, I chamfered the inner and outer edges of one end of the metal ring. Then I inserted the piston into the ring until the first ring touched the chamfer. Using two long needles I compressed the first ring until the gap in the ring was closed, then I applied a small amount of finger pressure to the bottom of the piston causing the first ring to slide into the ring. I repeated this ring compression three more times and left a small portion of the piston bottom protruding from the metal ring. The protruding piston bottom served to center the package directly over the center line of the housing bore and provided a visual clue to the alignment of the piston relative the housing. Finally, pressure was applied to the piston as it slipped from the ring and into the housing without any of the rings being allowed to re-open and interfere with a smooth insertion.