5.8 B2 Brake Band Piston Assembly Damage

As can be seen from the picture below the inner B2 Piston crown had fractured into four pieces. It fractured circumferentially around the inside diameter of the piston. The thimble piece (no part number or name given or located in PET5) had the large diameter flange fractured off just under the flange. The inside of the cylinder liner located in the Brake Band Piston Assembly appears to be a press fit (steel cylinder liner in this case) showed a slight seizure mark about one third the circumference of the bore approximately at mid length where the piston appeared to have canted and seized. The hypothesis of the the contributing events, that led to the failure of the B2 Piston will be discussed later in this report.

B2 Piston Assembly damage

B2 Brake Band Piston Cover "O" ring, Piston Assembly Bush and lip seal

5.9 Description and History of Old B2 Piston Assembly

B2 Piston Old model Piston Assembly appears to be cast iron

Old B2 Piston Assembly on LHS & Modified B2Piston Assembly on RHS

The old model B2 Brake Band Piston Assembly appears to be a cast iron assembly and it can be noted that the plastic type sealing ring is very similar to a piston ring (rectangular cross section). It was reported that the Brake band Piston Assembly was redesigned in

the late 80s into a more robust unit and manufactured from aluminum. This seal ring was reportedly modified by MB in the late 1993/4 into a "T" shaped seal ring and the cylinder liner was modified to a plastic material replacing the steel liner. Both these modifications were reported to have been made to reduce the instances of seizure/binding due to canting of the outer and inner pistons and to reduce bore wear which could increase the instance of binding.

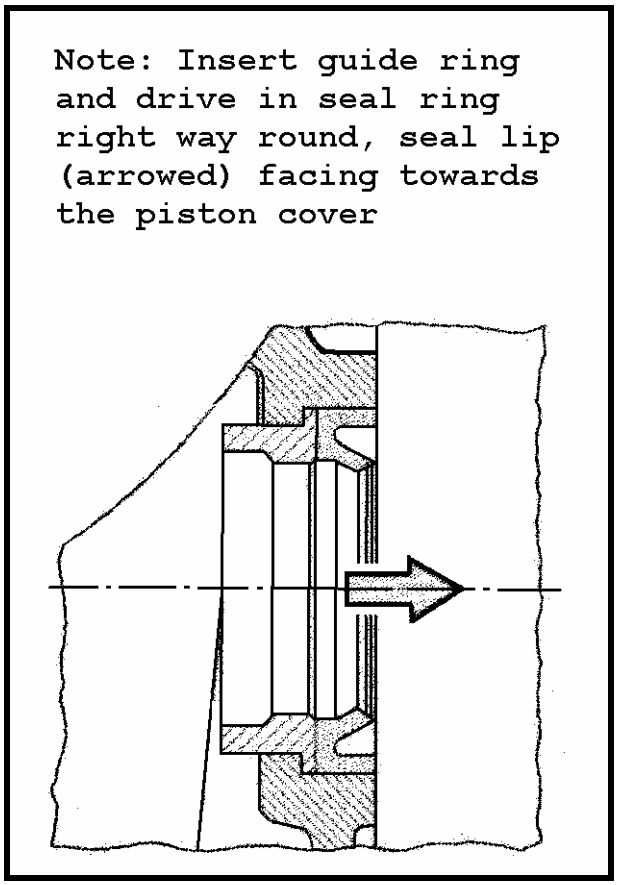
The above modifications are explained in the Document "B2 Piston Failure in Mercedes-Benz 722.xxx Automatic Transmissions" which can be found at:
http://business.baylor.edu/Richard_Easley//autofaqs/b2piston.htm
Note: There is an under score _ between Richard and Easley in the above address.

Richard recommends that any pre-1994 MB should be fitted with the new version of the B2 Brake Band Piston Assembly with the above mentioned modifications as a preventative maintenance precaution. No recommendations are made or inferred by this report. The report covers what was done when the transmission was opened up for investigation of the failure and the repairs and maintenance carried out to return the AT to good working condition.

It will be noted from the photograph above that the B2 Brake Band Piston Assembly as removed from the vehicle had the more robust aluminum assembly, it was fitted with the "T" seal ring, however, it still had the steel cylinder liner fitted for the thrust pin actuating piston.

It was decided to renew the B2 Brake Band Piston Assembly, as a total replacement unit, to renew the Cover Plate O-ring seal as well as the lip seal item 7, part number 006 997 734 7, as shown in PET5 illustration number 307-55. To renew the seal it necessitated driving the bush and seal out from the inside the transmission case.

Important Note:
PET5 illustration 307-55 shows an incorrect location of items 6 & 7, the bush (Part Number 126 277 085 0) is installed after item 7 sealing ring (Part Number 006 997 734 7) when in fact it is the opposite as shown in the WSM Page 37-153 where the illustration below clearly shows the bush is installed first and the sealing ring in the top of the bush with the lip seal facing towards the B2 Piston Assembly Cover. This is because the pressure within the B2 Piston cylinder is approximately 90psi when the B2 Brake is applied. If this seal is installed with the lip seal toward the internals of the transmission the ATF could bypass the lip seal and the Piston could fail to activate the B2 Brake Band, which could cause the same failure of no forward motion in any of the forward gears.

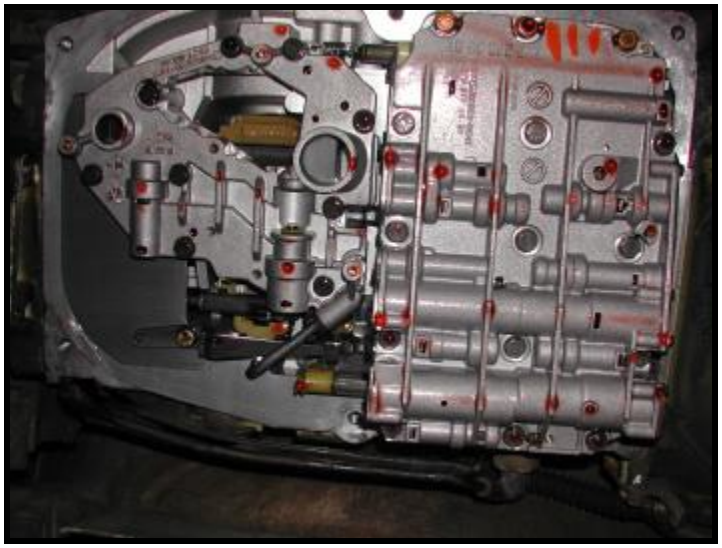


Sketch of location of bush and lip seal facing outwards towards piston cover

B2 Brake Band Piston Lip Seal and Bush

6 Oil Pan and ATF

The ATF was drained from the oil pan drain plug and the pan was removed by removing the ATF reservoir and the 6 retaining bolts.



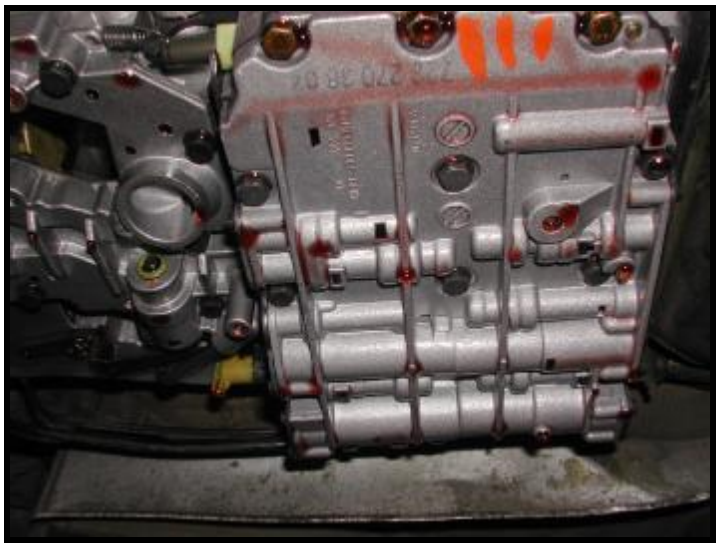
View of internals of AT with Pan and Filter Removed.
On lower LHS space between centre is the oil pipe, detent quadrant leaf spring and Range (Gear) Selection Valve with Slide Head can be seen

On removal of the oil pan there was some debris from the failed B2 small Piston crown laying in the bottom of the pan, however considering everything the pan was quite clean. The ATF removed was still in very good condition as the AT was serviced in August 2003 at 71,018 kilometres, which consisted of a filter change, gasket change, and a total ATF change. The good condition of the oil would indicate that there was no clutch slipping or overheating of the clutches or brakes within the transmission.

6.1 Removal the filter Element

The filter element Phillips-headed securing screws were removed and filter element inspected. The filter element, viewed via the outlet orifice, and the wire screen viewed from the suction orifice was relatively clean in view of the service period of approximately 9,500 kilometres and approximately 1.5 years in service.

6.2 Valve Body



Automatic Transmission Valve Body

The next step was to remove the valve body. To insure the correct replacement of the holding set bolts a white cardboard template was made and the holes were cut out with a wad punch to accommodate the set bolts in their correct positions.

Valve Body Template to hold set bolts

Prior to removing the valve body the garage floor directly under the transmission was cleaned and white paper was laid out to catch any parts that may have fallen out. There are numerous parts contained within the valve body interface section with the transmission. The valve body was removed extremely carefully and thankfully no items fell away from the transmission or sprung out from the valve body inner face.

1990 Porsche 928 S4 Auto B2 Brake Band Piston Failure

Note: With reference to the WSM and the Auto Trans Diagnosis – 722 series pdf article mentioned above it is suggested that the position of the valves, oil injector, oil deflector, strainers, one way check valve, temperature throttle, filler piece, locating pin etc., as shown in the various sketches, are noted to ensure that they are all present and accounted for and installed in the correct places and in the correct plane when reinstalled.

Once removed the valve body was placed on the prepared clean work bench covered with white paper and then it was covered with another sheet of white paper.

As a further precaution the central vacuum cleaner was isolated as the motor and dust catcher are located in the garage.