

## 2003 Mazda 6s 5 speed Automatic High/Reverse Clutch Repair 8-11-12

Transmission is a JATCO JF506E and it's used in Mazda's, Jaguars and Nissans

The Mazda # is JA5A-EL or 5F31J

### The Story:

This car has a trans cooler I added at 59K to help with check engine light fault with code P0740 "torque converter clutch circuit malfunction". This fault has lit regularly ever since on hot days, hot trans when shifting to fifth especially if going up hill even slightly. Fault is thrown because converter takes too long to lock up because it was low on pressure due to the failing seal rings (in high clutch circuit) that finally failed almost 100K miles later. After this recent repair the fault is no longer tripping and the shifting feels firmer than it has been in years.

My major issue started last week at 147K miles with the "AT" dash light coming on and the trans shifting in a very harsh way while on the highway at the top of a big hill. I got off the highway and when I rolled up to a light it would not go – just revved up! I shut it off, checked fluid which seemed a bit burnt but full. Restarted it and it went fine except when it got to 3<sup>rd</sup> it slipped badly. I used manual mode and just shifted quickly past 3<sup>rd</sup> up and down and got home 250 miles later. Research found a post by a guy with similar problem who fixed it himself on a Mazda MPV here:

<http://forum.mpvclub.com/viewtopic.php?p=206434> (4<sup>th</sup> post down). Based on his info I diagnosed a cracked High Clutch piston which is apparently common on this trans. Later in testing it while cool, I was able to shift to third gear and get it to hold OK so I assumed the "leak" in the high clutch was bad enough to let the fluid drain out and make for a very slow shift to third gear but not bad enough to cause zero pressure and never engage third. As it turned out my piston looked good (a crack check may find hairline faults but visually it looks OK) but the Teflon seal rings in the manifold built into the trans drivers side cover were damaged by excessive wear and leaking which caused all my troubles.

### THE LOGIC

Here is my logic: With the cracked high clutch piston (or leaky seal rings in the high clutch circuit) when the car drives the oil spins out of the high clutch piston area so when third gear comes it slips as it takes much longer to energize the high clutch which is full of air. (the high clutch is pressurized in 3,4,&5th gears). When I shift from 4<sup>th</sup> to 3<sup>rd</sup> the 3<sup>rd</sup> gear held (as it was already full of oil). Apparently the crack (or leaky seal ring) allows oil to leak into the reverse clutch and slightly energize it causing it to burn. This is where the burn't fluid smell comes from (I had burnt smell). The crack is likely very small as it still allows enough pressure to drive in the high gears without slippage once it finally makes the shift. The harsh shifting on the highway initially was some sort of "AT" limp home mode where it runs the trans in a much higher pressure causing harsh shifts. Once I turned the car off/on it and started shifting from 2<sup>nd</sup> to 4<sup>th</sup> the AT light never came back on and I never had any more harsh shifts. Lesson if you see the AT light – pull over – shut the car off and it should clear out – then see what the symptoms you have at normal trans pressure.

### THE PARTS:

Qu	Description	Price	Vendor
1	Ring Kit 183175A (for 3 Teflon seals in end cover – mine were bad)	24.89	<a href="http://www.WITTRANS.com">www.WITTRANS.com</a> 877-634-5699 (contains other seal rings as well)

2	Reverse steel plates W183130A	7.92	<a href="http://www.WITTRANS.com">www.WITTRANS.com</a> 877-634-5699
2	Reverse friction plates W183110A	13.00	<a href="http://www.WITTRANS.com">www.WITTRANS.com</a> 877-634-5699
1	W183338AK seal set high/rev Clutch	15.50	<a href="http://www.WITTRANS.com">www.WITTRANS.com</a> 877-634-5699
1	Piston Kit Rev/high	57.99	CobraTransmission.com 800 293-1848
5	High Clutch Friction plates WB3106BA	23.75	<a href="http://www.WITTRANS.com">www.WITTRANS.com</a> 877-634-5699
1	AT trans assy lube	5.50	<a href="http://www.WITTRANS.com">www.WITTRANS.com</a> 877-634-5699
4½	Qts Mercon-V Trans fluid	\$25.63	Autozone
	TOTAL	196.88	Incl shipping & tax

- I could have replaced the o-rings on the 2-4 brake piston but didn't. Might be a good idea as it is the only rubber part I handled that didn't get replaced.

## THE REPAIR

This repair will remove the left end (drivers) end cover of the transmission which will allow removal of the Reverse/High clutch pack (1<sup>st</sup> one out) and other clutch packs if you keep removing more as you get deeper in.

1. Remove drivers wheel

2. Remove inner wheel well linings (small one covering trans and the larger one that goes all the way around the wheel well– the little retainers are a pain as the inner plug usually won't pop out easily so you end up prying them out by force – the ones with the Phillips screw unscrew and are a bit easier to remove.

You'll probably want to order some replacement retainers as many of them don't come out without tearing them up. Order these 8mm versions: [http://www.clipsandfasteners.com/Push\\_Type\\_Retainer\\_GM\\_Ford\\_Chrysler\\_p/pas1860-25.htm](http://www.clipsandfasteners.com/Push_Type_Retainer_GM_Ford_Chrysler_p/pas1860-25.htm)

3. Under the hood - remove the airbox complete (two plugs and a vent line) and remove its mounting plate as well.

4. Remove the battery and its base bracket.

5. Remove the shifting cable (square clip) and its mount – (2) 12mm bolts to allow trans mount to come out in next step.

6. Remove top trans mount - Put a jack under the trans (I used two because the trans seemed to shift towards the front) and remove the upper trans mount (the rear 15mm bolt is a bitch to get to unless you remove the crossbolt in the trans mount and remove the trans side of the mount first.)

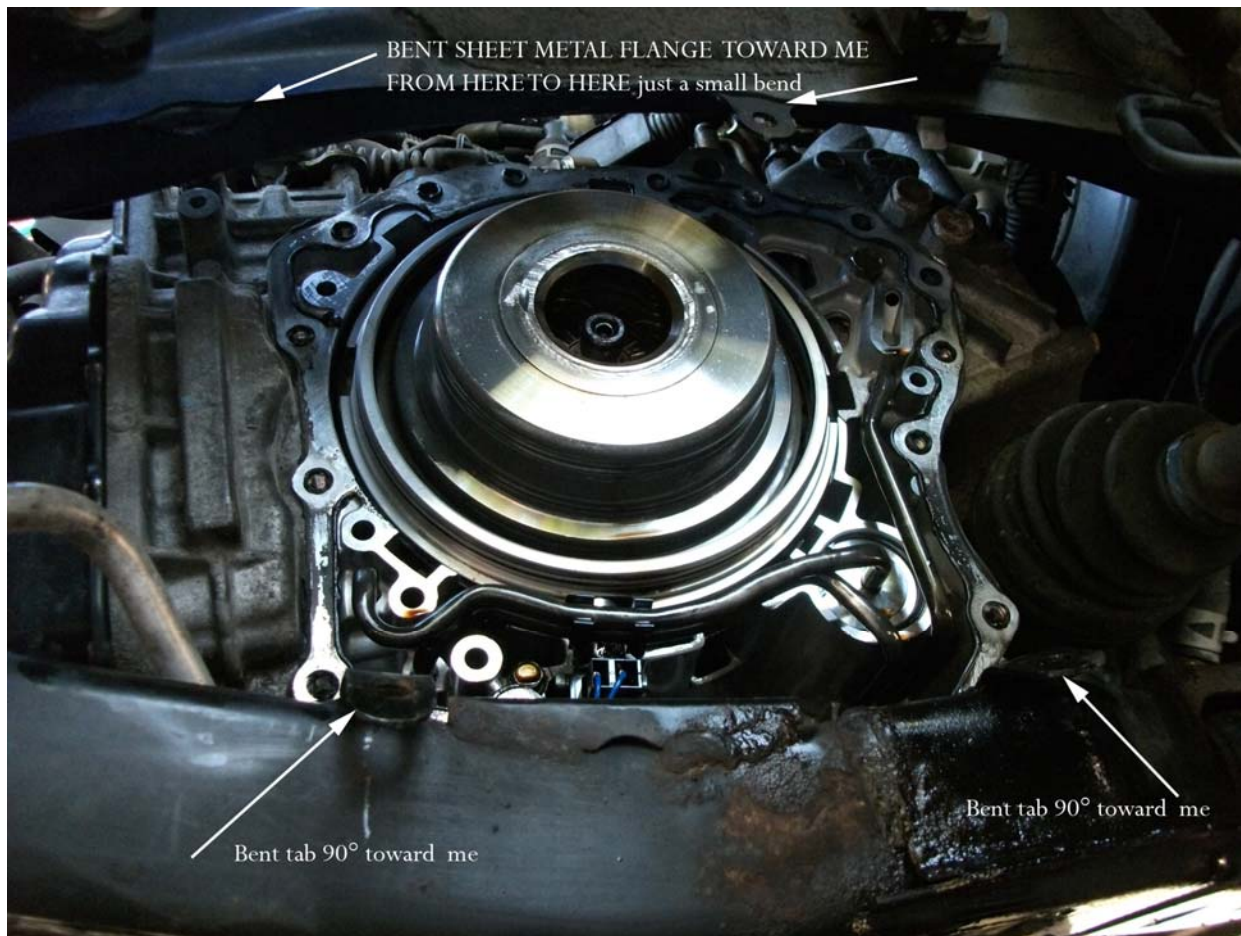
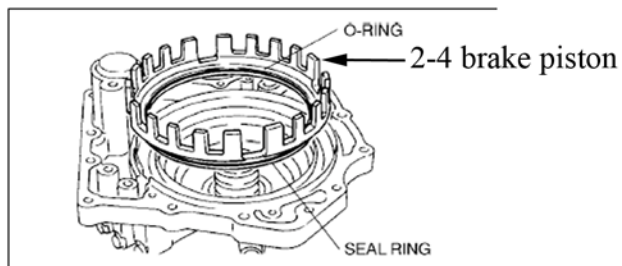
7. Remove water line - You will see a steel radiator line that passes in front of the trans cover that will have to come out. Now you can get to the hose fittings to remove the steel water line. (I also removed the front under carriage plastic tray to allow the antifreeze to be caught in a pan directly. Very little comes out when you break this connection till you loosen the cap on the overflow tank then you get almost a quart of antifreeze. With the trans mount removed you can get the water tube out by snaking it around to the front.

8. Remove 12mm retainer bolt that hold brake line in place – this will allow the brake line to be moved just enough to get the trans cover out.

9. **Drain the fluid from the trans** – It's a big 24mm hex plug back under the trans. Expect 3.5 qts. plug has a magnet in its center – clean it up – look for metal pieces – mine was amazingly clean.

10. **Bend a little sheet metal** - To get the end cover off the trans I had to bend the two tabs near the bottom of the cover(mounts for the fender liner) on the frame out straight (bend 90°) and I had to bend the lower edge of the frame sheet metal out maybe a ¼" just left of where the front brake line attached. A big crescent wrench is all that's needed to bend all three of these thin metal areas. The 12mm & 17mm bolts on the cover have a thin hex so to prevent rounding them I ground down 3/8 drive sockets so they have no internal chamfer and the socket is a bit shorter than normal. Used with a 3/8 breaker bar this will give you a compact setup in this tight space. Be careful not to round off a bolt or your in for trouble.

11. Once all the bolts are out of the cover a quick wrap from the top with long prybar that found a tiny overlap with the case broke it loose from the sealer. ½ qt oil will come out – be ready. The spring pack acting on the 2-4 brake piston will push the cover out about ¼". As you work the cover loose you will have to look inside from the top and work the 2-4 brake piston (see above) out of the cover bore so it stays in the trans.



(Shown above with cover already off) Two long screw drivers work – it comes out of its bore in the cover pretty easy. Just work it back into the trans so it's out of your way (it's the outer ring in the photo above).

I got the cover out by jacking the trans up about  $\frac{1}{2}$  to  $\frac{3}{4}$ " to get the lower edge of the cover just over the frame and working the cover towards the front of the car and rotating it about  $20^\circ$  counterclockwise is the way out. It's tight! but it does come out.

10. The reverse/high clutch assembly just slides out and your ready to hit a clean bench to rebuild it. Pay particular attention to how the needle brgs came out as this is one of the only things that is not obvious in reassembly.

View from the top with high clutch already out:

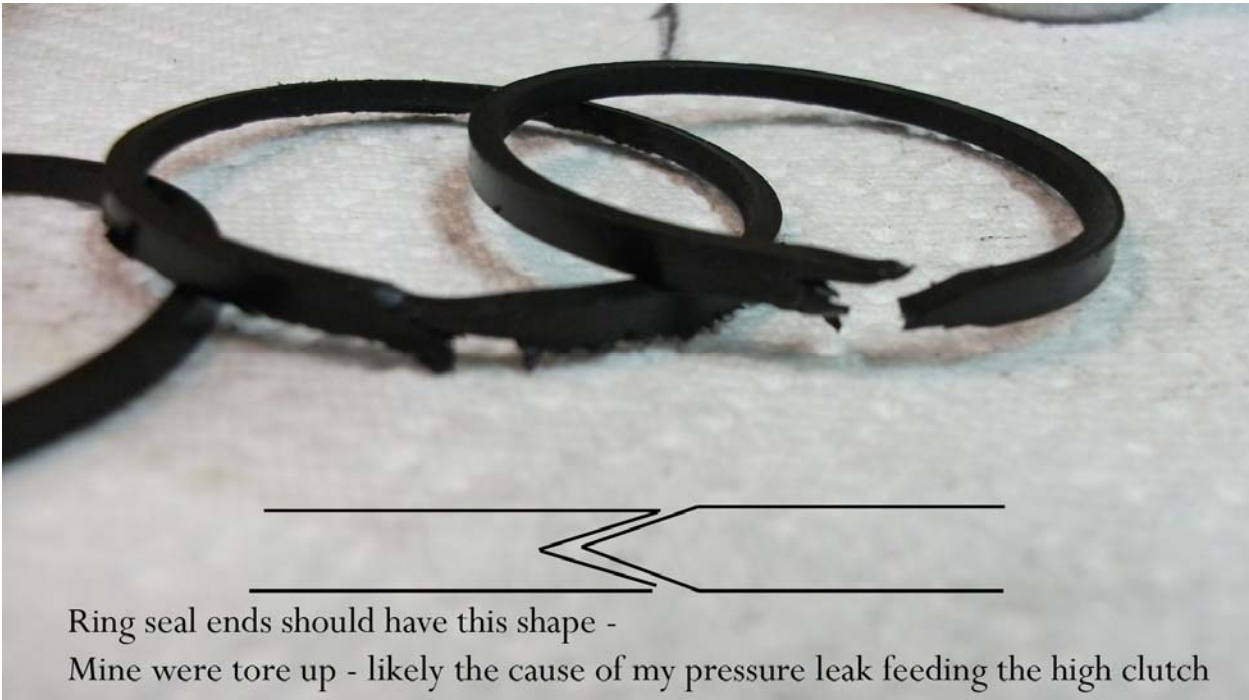


11. There is one holdup in getting this high clutch assy apart and that is getting the small snap ring off the high clutch hub as it is preloaded by a spring pack. They make a nice expensive tool to compress this but I used my radial arm saw as a press with two jaws from a gear puller to press down on the hub so I could release the snap ring. It's pretty stiff . The retainer plate and snap ring are easily bent so be careful. Note – for reassembly I had to take it to the trans shop – too stiff for my shade tree setup.

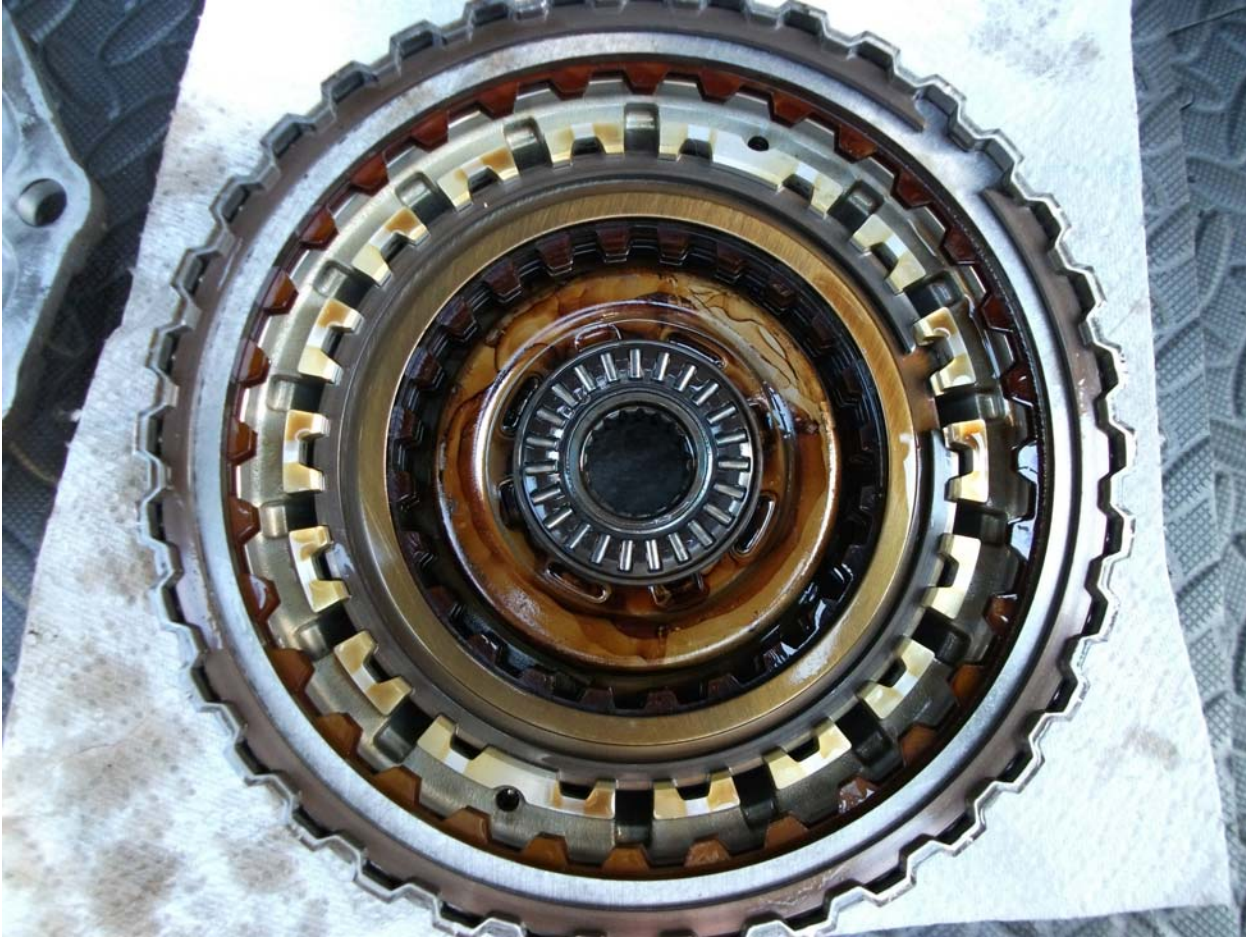




12. You will note in the end cover there is a piston shaped oil manifold with 3 teflon seal rings on it's OD and the face is a race for the needle brg that's inside the reverse/high clutch assembly. These seal rings looked pretty tore up on mine – replace them for sure – they are in the Ring Kit 183175A that's on my list. I think its likely this was my only problem but I feel better about replacing the high clutch piston as that is a known failure piece.



13. When disassembling the clutch pack unstack everything and number it. Pay particular attention to how the needle brgs came out as this is one of the only things that is not obvious in reassembly.



14. Reinstalling the piston and reverse and high clutch plates is pretty straight forward.

It's good practice to use assembly lube on all seals and bearings.  
Keep it clean! Even fuzz from paper towels is not good.

Take time to carefully remove all the old gasket sealer from the cover surfaces.

The clutch assembly goes back on the transmission shaft smoothly – just rotate it back and forth to get all the friction plates engaged. Make sure needle brgs are in correctly.

15. Loosely set the 2-4 brake piston into the trans. Its symmetrical and any of the 4 slots can go over the sensor. As the cover is installed this large very thin piston will insert itself into the bore in the cover – use assy lube here to lube the seals as well as the 3 teflon rings on the cover manifold.

16. Clean gasket surfaces with brake cleaner to remove all oil. Put a light coating of silicone gasket sealer all the way around and around all bolt holes. Note the two 17mm bolts in the cover have orings on them. Make sure they are there and in good shape. Reinstall the cover. It goes back on easily.

17. Reassemble everything removed in reverse order. Add 4 quarts Mercon V

Fire it up – check fluid level. Test drive – Good as new!