



How to fix problem with 2010 Mazda 5 (3) air conditioner magnetic clutch

Mazda 5 2010 air condition is periodically failing. Cleaning the magnetic clutch solves the problem.

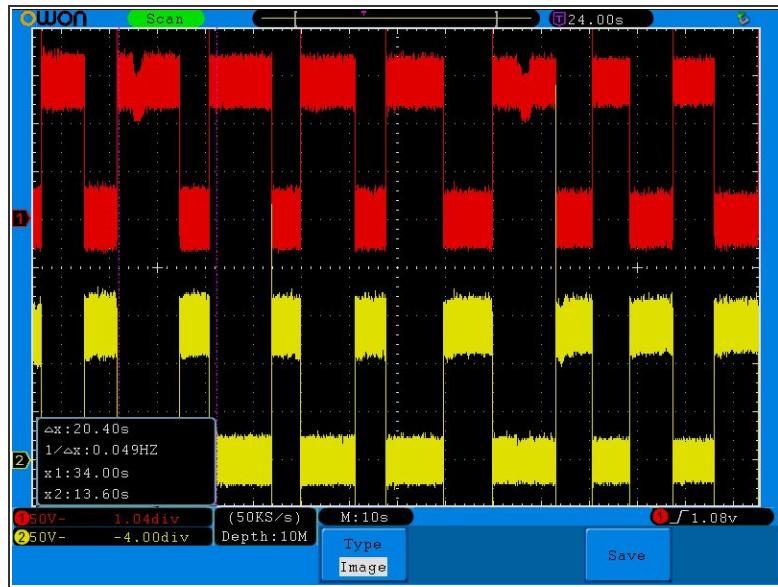
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INTRODUCTION

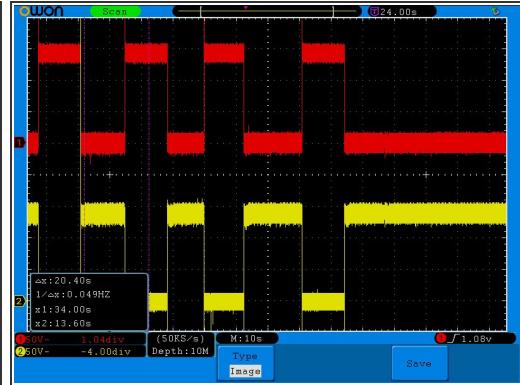
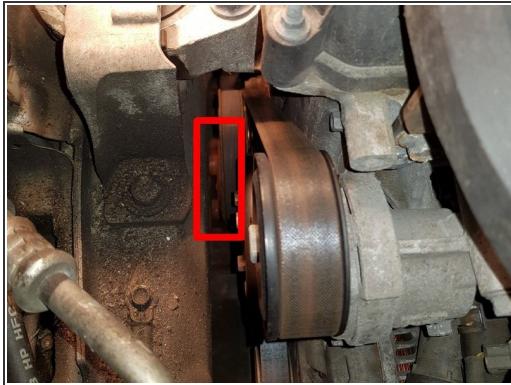
The aircon in my Mazda 5 from 2010 is periodically failing. This has been going on for 3 years now. My mechanic had checked the fluid level twice and eventually told me I need a complete new compressor costing DKK5800 = USD850. Since I would loose a lot of money anyway, I decided to inspect the problem myself and I ended up saving a bunch of money.

Step 1 — Identifying the problem



- The aircondition is under normal conditions not running permanently, but it is running in intervals, e.g. on for 10s and then off for a similar amount of time.
- On colder days, the 'on' period will be relatively shorter. On hot days, the 'on' period will be relatively longer - ultimately permanently on.

Step 2 — The magnetic clutch and the fan



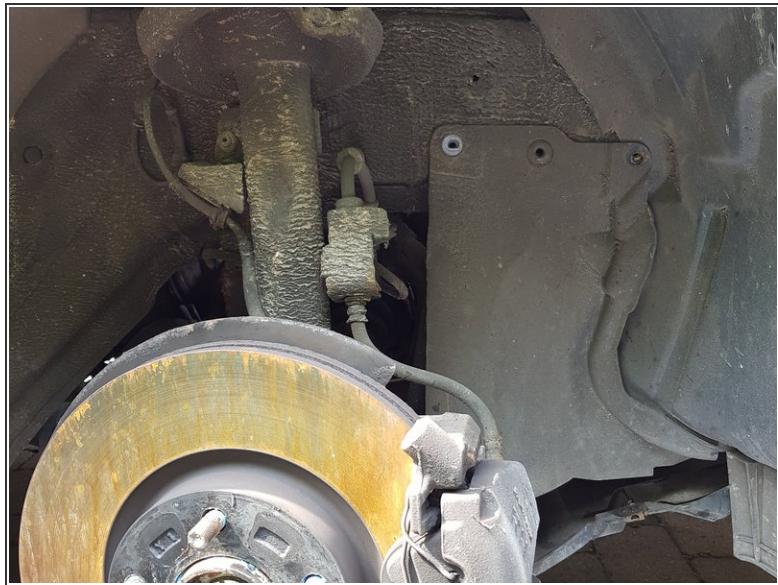
- When the aircon computer signals 'on', the magnetic clutch will engage and thereby activate the aircon compressor.
- Whenever the magnetic clutch is engaged, the cooling fan is also activated (at least on my Mazda)
- When leaving my the car in idle for around 15 minutes, the aircon suddenly stops working:
 - The magnetic clutch stops engaging, though the computer is telling it to activate (see oscilloscope dump)
 - The cooling fan is permanently on, suggesting that the clutch should also be engaged, which it obviously is not.
- Stopping the car, and letting it cool down for a while (30 minutes?) will normally make the magnetic clutch engage again.

Step 3 — Testing the hypothesis



- So the suspicion is, that the clutch is actually activated by the aircon computer, but for some reason the clutch is unable to engage.
- By turning front wheels, it is possible to partly see the magnetic clutch (it is in the red circle on the photo).
- With a small stick (I used a bamboo stick) I can carefully, but firmly, poke the clutch, and thereby helping it to engage. Be careful - there are a lot of moving parts in there...
- Shortly after the clutch is engaged and cooling is ongoing, the aircon computer will release the clutch again (like during normal operation)
- Next time the aircon computer tries to engage the clutch, it will fail. Again it is necessary to poke it with the stick, to make it engage.
- The above indicates that something is obstructing the normal operation of the magnetic clutch.

Step 4 — Is the magnetic clutch stuck?



- The magnetic clutch should apparently be able to move a little when you pull/push it with your hands - mine is completely stuck. This video demonstrates this, and it also demonstrates the "poking with a stick" trick. <https://www.youtube.com/watch?v=Hqp9lJ2i...>
- To get better access to the magnetic clutch, lift up the car and remove the right hand front wheel. Place the wheel under the car as a safety precaution.
- Behind the brake disc you can see a plastic shield that is easily removed to access the clutch

Step 5 — Getting access to the magnetic clutch



- Remove the 4-5 screws holding the plastic shield covering the magnetic clutch
- Unscrew the bolt in the center of the magnetic clutch. You will need to hold a screwdriver like in the picture while you loosen the bolt

Step 6



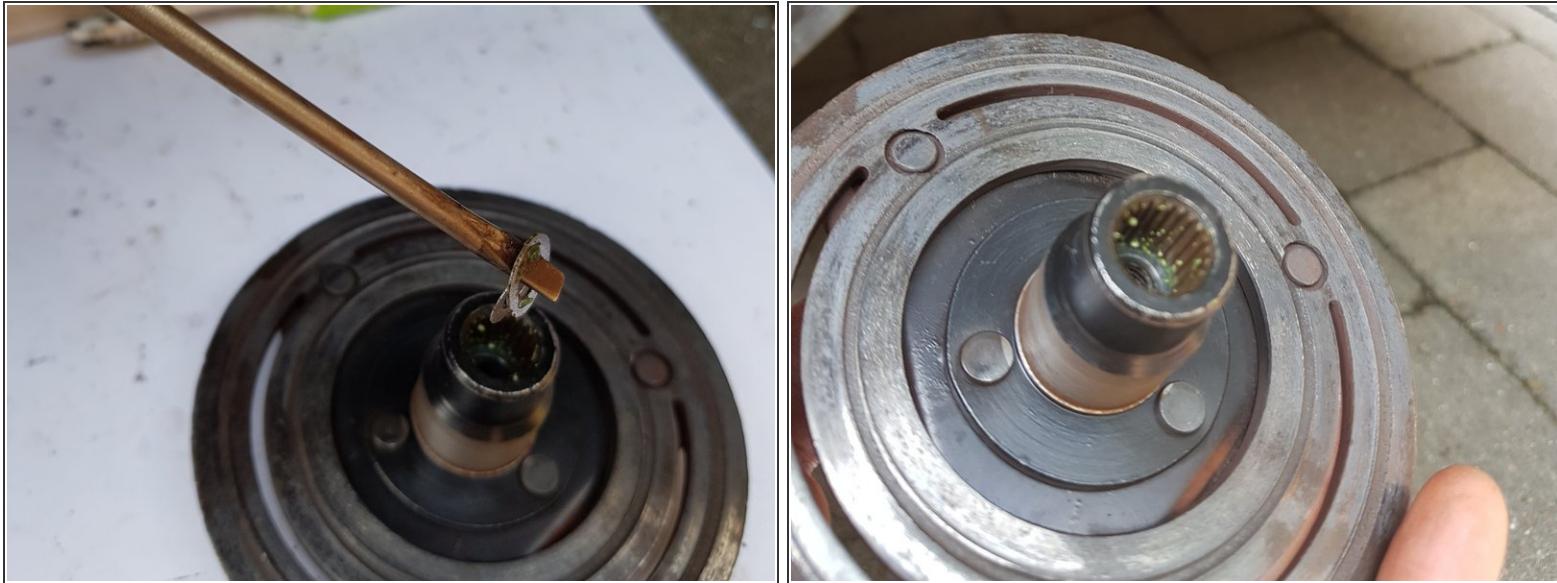
- I am completely unable to move the clutch plate with my fingers. I used some scrap metal pieces to gradually force the plate free.
- NOTICE: later I discovered that a bolt can actually be fitted (see pictures for the next step)
- Gently hammer on the clutch plate top and bottom, while carefully forcing scrap metal in behind the clutch plate.
- Applying some WD40 did not seem to make much difference, but you can give it a try.

Step 7



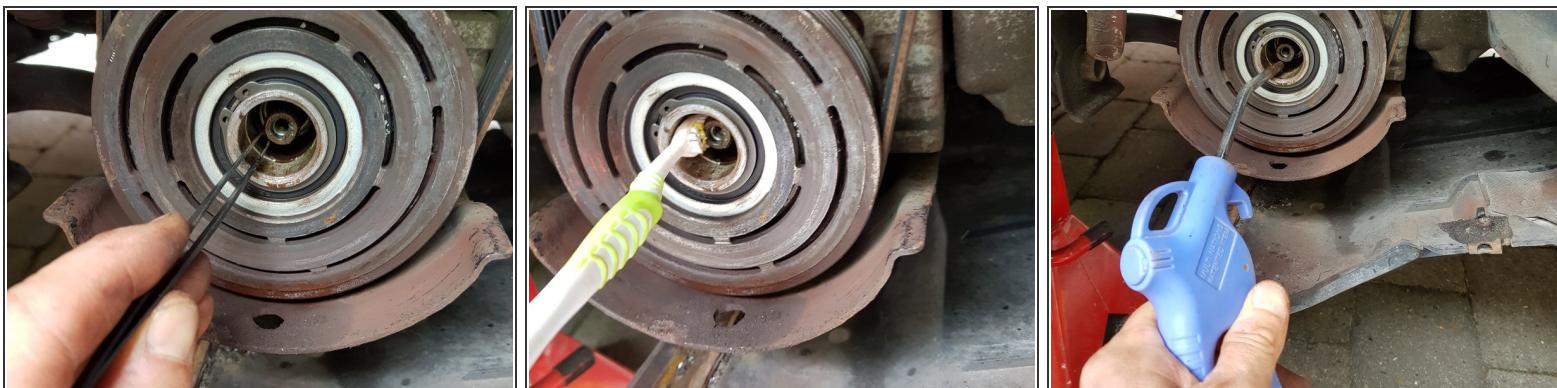
- Though it took a bit of brute force to get the plate free, it did not suffer any visible damage. You can barely see the shims inside - be careful not to lose them.
- It was only after I got the plate loosened, that I noticed that it is actually threaded to allow a bolt being screwed in. This could probably have been handy when loosening the clutch plate.

Step 8



- Be careful to get the shims out, so they are not accidentally lost. My clutch had 2 shims.
- Inside the clutch plate, I could see bits of green/corroded debris.

Step 9



- Clean out all visible debris from clutch plate and the clutch itself.

Step 10



- Microscope (4x) view of the debris. I cannot tell where it originates from.

Step 11



- After cleaning everything carefully, I also sanded the two parts a bit, and applied a bit of grease.
- Verify that the clutch plate can now move back and forth easily.
- Assemble everything again, and enjoy a working an aircon that does not stop working while you are driving.

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To reassemble your device, follow these instructions in reverse order.