

Automotive Air Conditioning Analysis

Fresh/Recirculation Air Door Dramas:

Welcome back to another episode of AC Tech Talks! As we head into the winter months I will be discussing problems that are hard to identify and easily overlooked in cooler temperatures, particularly in this issue where I will be discussing the

commonly unnoticed problem of the inoperable fresh/recirculation air flap and the effect this problem has on the AC system. Over the long summer months we have had many customers returning with the common complaint that their AC is working but is not as cold as it should be and further that it loses its cooling ability the longer they drive. After inspecting the vehicle we notice that all the pressures are good and the car is operating correctly, however the “fresh” air option has been selected. This is a bigger issue than most realise!

The fresh/recirculation door located at or before the blower motor, controls where the air that is passed through the evaporator and used in the cabin comes from. In particular it selects fresh (outside) air or cabin air. In my years, one of the most difficult tasks has been educating customers that the word “fresh” air, does not particularly refer to the quality of air, but more so where it comes from, and that if they wish for their air-conditioning to work efficiently they need to select recirculation or they will just be trying to cool the world! I always explain that it is like turning on the AC in your house and then opening all the doors; of course you will feel cool sitting directly in front of the vents but your room will never achieve a comfortable temperature.

So why all this talk about vent selection? One of the most common faults causing inefficiencies in an AC system is an inoperable recirculation vent, particularly unnoticed in winter when the outside ambient temperature is already low. A car air-conditioning system is designed to remove heat from the air at the evaporator and transfer it out of the AC system at the condenser. This considered a car constantly drawing fresh air as opposed to already cooled cabin air must work a lot harder and will not be able to keep up with



the heat load, eventually causing the vent temperature to be “not as cool” as the customer explains. The common effects of a vent stuck on “fresh” starts to become apparent after the car has been running for more than ten minutes in a hot

environment. Some common effects are as follows:

- The gauge pressures read slightly higher than normal. Typically the suction will be about 20-30 pounds higher.
- The suction pipe is sweating a noticeable amount but is still cold to touch.
- The evaporator drain tube is producing a larger than normal amount of water.
- Vent temperatures struggle to get below 13 degrees.
- Non-climate control systems fail to cycle out.
- Complaints of the system slowly losing cooling capacity after the car is first started.

As mentioned earlier these effects are less noticeable in cooler climates. This considered, it is easy to overlook issues related to fresh/recirculation air flaps when performing quotes or carrying out the final checks on your customer’s car, especially inside a cooler workshop. But we must remember that when the system is exposed to a hot and humid summer day the effects will become noticeable and the system will begin to fail. Avoid the headaches of return customers and make it a standard procedure in your workshop to check the recirculation door on every quote. This is not a hard task! The easiest and most effective method for checking the flap operation is performed in the cabin. Simply select high fan speed and switch from fresh to recirculation and listen for a change in airflow. If there is no change, it is safe to assume there is a problem and further investigation is required.

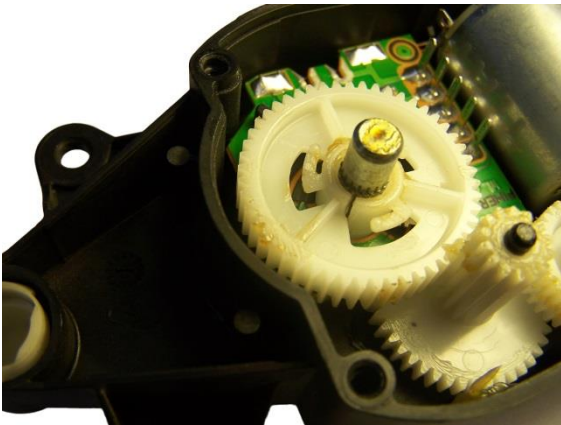
The Common Circulation Fault: AUDI A4 & VW PASSAT:

Without a doubt the very best example of a faulty fresh/recirculation vent flap is the Audi A4 and VW Passat. We have performed countless jobs on these

cars and never once have we seen a working recirculation vent.



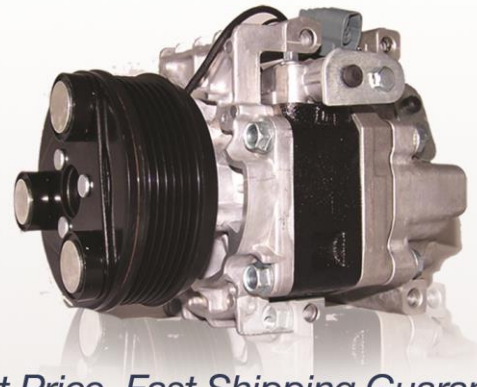
The Audi uses a stepper motor as pictured above. The error that occurs is internal to the stepper motor where by the main drive cog splits around the thin connection point at the shaft as you can see in the picture below.



In many cases manufacture faults are rectified using a replacement aftermarket or genuine upgraded part to repair and prevent further troubles, but in the case of the Audi A4 I have not yet come across such a part. Until such a part is found, the only method to repair this fault is to simply fix the vent into the recirculation position as it appears that every second hand unit has suffered the same fate. In our last attempt to find a stepper motor from a wrecker, we went through six, all with the same fault.

Fresh/recirculation vents do have a dramatic effect on the operation and performance of the AC system and a broken vent will cause a reduction in the cooling capacity in any car. Make the simple vent test a standard on your quotes and save yourself from comebacks! This Tec Article was bought to you by CoolCompressors and MrCool Automotive. Written by Benjamin Perry, Technician and Marketing Manager. Please forward any questions to ben@mrcool.com.au.

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Ph: (07) 3369 3033 E: ben@mrcool.com.au