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System test and fault diagnosis

Initial tests

Introduction

These initial tests describe the sequence of events that should occur when the ACU is switched on, one test applies to a car with a 'cold' engine, the other test applies to a car with a 'hot' engine i.e. when the coolant is above 44 °C.

The right-hand column indicates which fault diagnosis chart to use or which part of the system is probably faulty. However, the test should be completed fully before attempting any rectification to enable a complete picture of the malfunction to be given.

'Cold' engine

1. Turn ACU switch to AUTO and both temperature selectors to maximum temperature position. Start engine. **The fans should not operate**	Interlock or Inhibit circuits faulty.
2. The lower quantity flap should be closed	Lower quantity flap fault diagnosis.
3. The recirculation flaps should be in the 'Fresh Air' position.	Recirculation flap fault diagnosis ACU switch faulty.
4. As the engine coolant warms up, **the lower quantity flap should open**	Lower quantity flap fault diagnosis.
5. The fans should start operating ONLY when the lower quantity flap is fully open	Lower quantity flap fault diagnosis.
6. Warm air will flow from the windscreen outlets	No airflow - Fans inoperative fault diagnosis Airflow from facia - Mode flap fault diagnosis Incorrect air temperature - Water tap incorrect. Upper servo fault diagnosis. Sensor chain fault diagnosis.
7. Warm air will also flow from the front and rear footwells.	Lower quantity flap fault diagnosis
8. Turn the ACU switch to DEFROST **Verify that the lower quantity flap has closed.**	ACU switch fault Lower quantity flap fault diagnosis
9. The fans should run at a fixed fast speed	Fan speed module
10. Air should only flow from the screen outlets	Mode flap fault diagnosis . ACU switch faulty. Upper servo fault diagnosis

11. Set the Mode Change switch to FACIA **The airflow should now flow from the facia outlets**	Mode change switch faulty. Mode change relay faulty
12. Set the Mode Change switch to AUTO **The airflow should now be from the windscreen outlets**	Mode change switch or mode change relay faulty
13. Set the Mode Change switch to FACIA **Airflow should be from facia outlets**	Mode change switch or mode change relay faulty
14. Switch off the ignition and immediately restart the engine **The fans should not operate for approximately 13 seconds**	Inhibit circuit faulty
15. Airflow should now only be from the windscreen outlets	Mode change switch or Mode change relay faulty
16. Let the 'In-car' temperature rise to an uncomfortable level to enable the mode, lower quantity and recirculation flaps to be tested.	
17. Set the ACU switch to AUTO and both temperature selectors to the minimum temperature position. **The airflow should only be from the facia outlets**	Mode flap fault diagnosis
18. The lower quantity flap should be closed	Lower quantity flap fault diagnosis
19. The recirculation flaps should be in the 'Recirculation' position Note. This can only be achieved with a combination of high 'in-car' temperature and an outside temperature above 5 C	Recirculation flap fault diagnosis
20. Slowly rotate the upper temperature selector away from the minimum temperature position **The recirculation flaps should move to the 'Fresh air' position**	Recirculation flaps fault diagnosis
21. The lower quantity flap should open	Lower quantity flap fault diagnosis
22. Stop rotating the temperature selector **Airflow should only be from the facia outlets and front and rear footwells**	Mode flap fault diagnosis
23. Switch off ignition & restart engine **The fans should start immediately**	Fans inoperative fault diagnosis

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24. Continue rotating the upper temperature selector away from the minimum temperature position until the Mode flap operates
Airflow should be from the windscreen outlets and the front & rear footwells

Mode flap fault diagnosis

25. Set both temperature selectors to the 'preferred' temperature position. Set the ACU switch to HIGH
The fan speed should increase

Fan speed does not vary fault diagnosis

26. Set the ACU switch to LOW
The fan speed should decrease

Fan speed does not vary fault diagnosis

27. Set the ACU switch to AUTO & drive the car on the road. Ensure that the system stabilises, giving a comfortable in-car temperature. Stabilisation is achieved when the fan speed decreases & becomes constant although this may not occur if the outside temperature is extremely high or low.

28. When the road test is completed and with the engine still running, raise the car bonnet and inspect the condition of the refrigerant through the sight glass of the receiver/drier.
There should not be any bubbles or foaming

Refrigeration system faulty

'Hot' engine

1. Disconnect the yellow/brown cable and the black cable from the 44 C fan delay thermostat and connect them together. Set the ACU switch to AUTO and both temperature selectors to the maximum temperature position. Start the engine
The fans should not operate

Interlock or Inhibit circuits faulty

2. The lower quantity flap should be closed

Lower quantity flap fault diagnosis

3. The recirculation flaps should be in the 'Fresh air' position

Recirculation flap fault diagnosis

4. Switch off the engine & reconnect the yellow/brown and black cables to the fan delay thermostat. Start the engine.
The lower quantity flap should be open

Lower quantity flap fault diagnosis

5. The fans should not operate for approximately 13 seconds

Inhibit circuit

For the remainder of this test, refer to paragraphs 6 to 28 of 'Initial test - cold engine'.

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