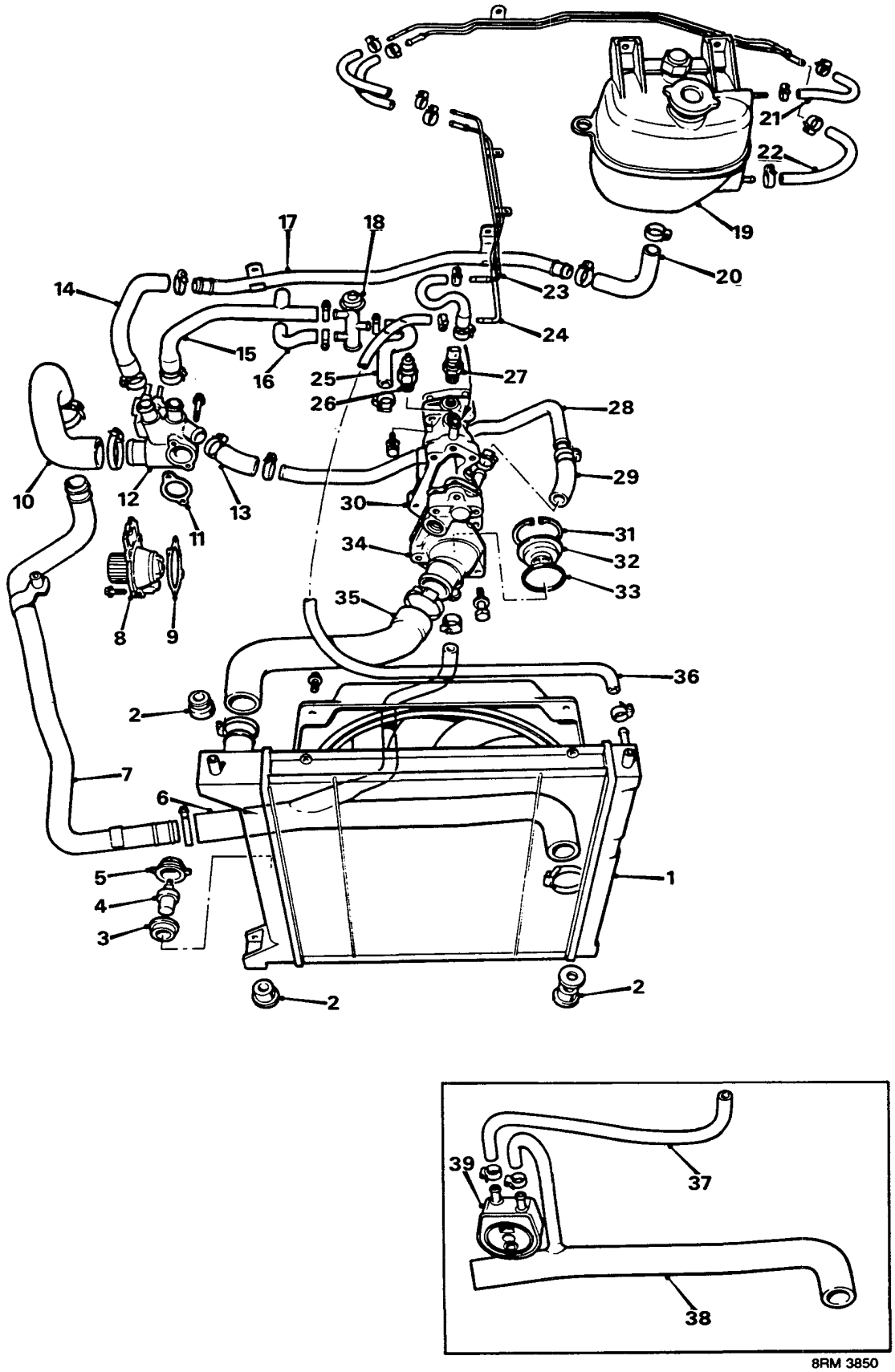
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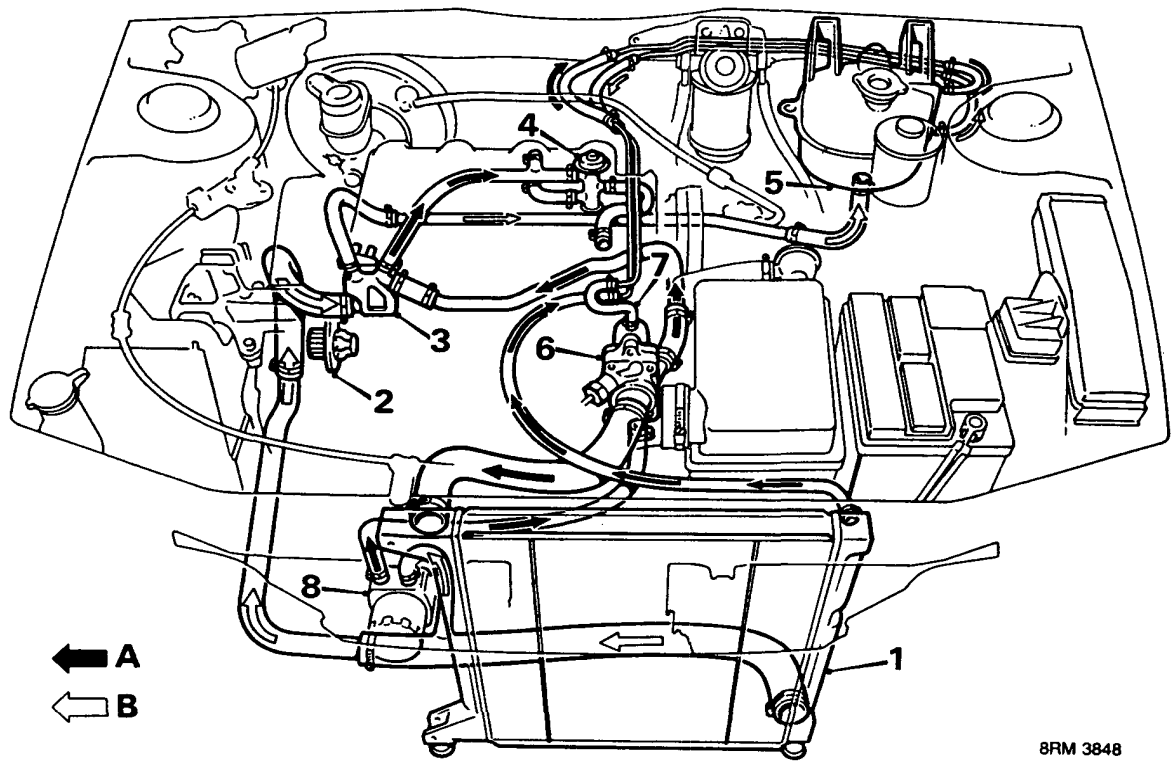
COOLING SYSTEM COMPONENTS

1. Radiator
2. Radiator mounting bushes
3. Sealing ring
4. Thermostatic switch
5. Locking ring
6. Bottom hose
7. Pipe - bottom hose to fuel heater
8. Coolant pump
9. Gasket
10. Hose - fuel heater to pipe
11. Gasket
12. Fuel heater
13. Hose - fuel heater to thermostat housing pipe
14. Hose - fuel heater to expansion tank pipe
15. Hose - fuel heater to heater valve
16. Hose - heater return to heater valve
17. Pipe - fuel heater to expansion tank
18. Heater valve
19. Expansion tank
20. Hose - fuel heater to expansion tank
21. Hose - thermostat housing to expansion tank
22. Hose - radiator to expansion tank
23. Pipe - thermostat housing to expansion tank
24. Pipe - radiator to expansion tank
25. Hose - thermostat housing to heater valve
26. Coolant temperature sender unit
27. Thermostatic switch
28. Pipe - fuel heater to thermostatic housing
29. Hose - fuel heater to thermostat housing
30. Thermostat housing
31. Circlip
32. Thermostat
33. 'O' ring
34. Cover - thermostat housing
35. Top hose
36. Hose - radiator to expansion tank
37. Hose - thermostat housing to oil cooler - Non - Turbo Models
38. Bottom hose - Non - Turbo Models
39. Oil cooler - Non - Turbo Models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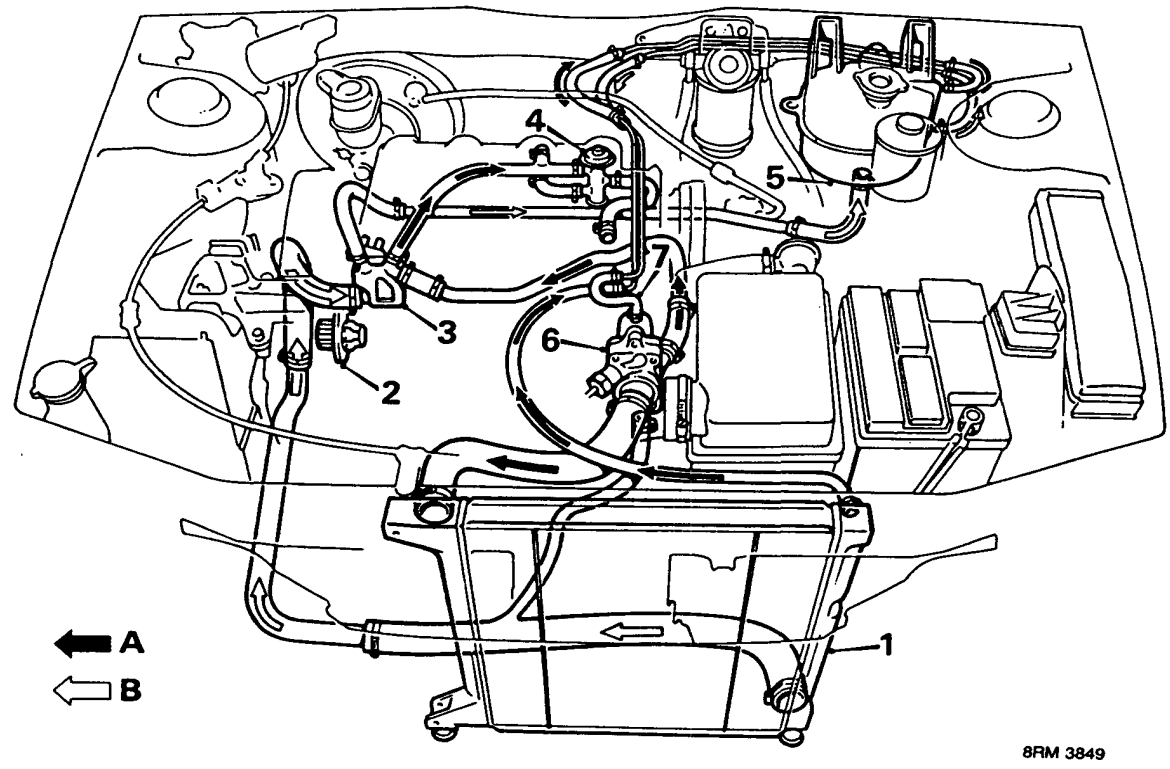
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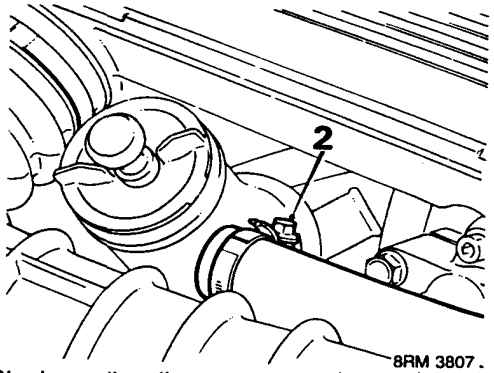
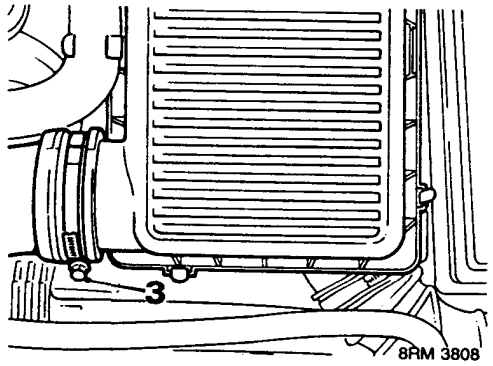
THERMOSTAT

Remove

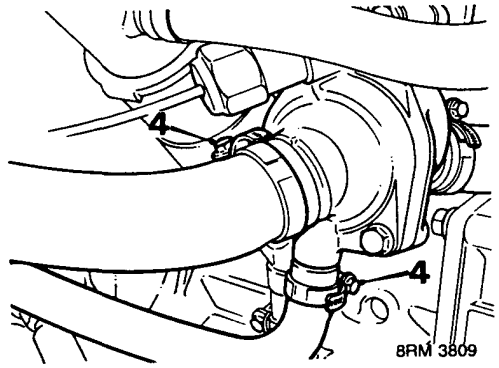
1. Drain cooling system, see **MAINTENANCE.**



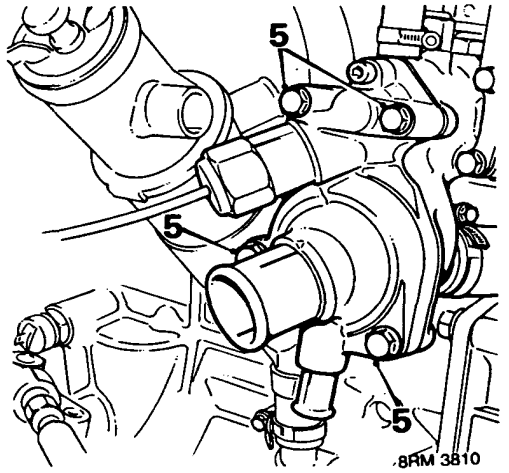
2. Slacken clip, disconnect crankcase breather hose from oil filler/dipstick tube.



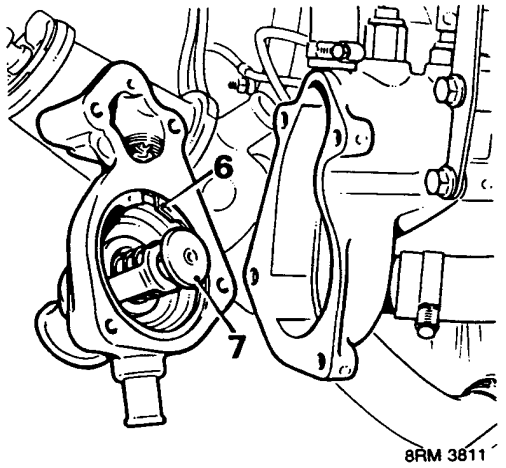
3. Slacken clip, disconnect air box hose from air cleaner.



4. Slacken 2 clips; disconnect 2 coolant hoses from thermostat housing.



5. Remove 4 bolts securing thermostat housing cover to thermostat housing; remove cover.



6. Using suitable circlip pliers, remove circlip securing thermostat.
7. Remove thermostat from housing.

Refit

1. Remove all traces of gasket from thermostat housing and cover using suitable gasket removal spray.
2. Position thermostat in thermostat housing; fit circlip using suitable circlip pliers.

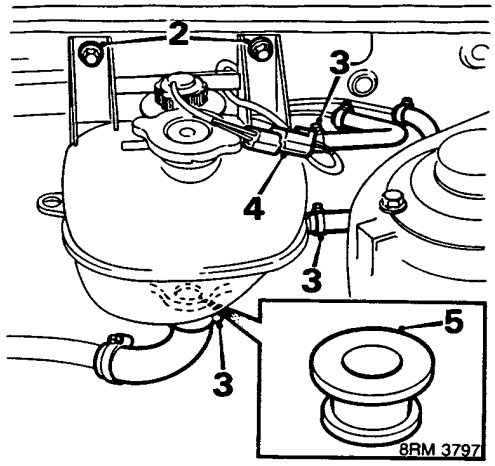
CAUTION: *Ensure circlip is correctly seated in groove.*

3. Position new gasket to thermostat housing.
4. Fit thermostat housing cover, fit bolts and tighten to 12 Nm.
5. Connect 2 coolant hoses to thermostat housing; tighten clips.
6. Connect air box hose to air cleaner; tighten clip.
7. Connect crankcase breather hose to dipstick/oil filler tube; tighten clip.
8. Refill cooling system, see **MAINTENANCE.**

EXPANSION TANK

Remove

1. Drain cooling system, see **MAINTENANCE.**



2. Remove 2 screws securing expansion tank to bulkhead.
3. Slacken 3 clips, disconnect 3 hoses from expansion tank.
4. Disconnect low coolant level switch multiplug.
5. Release expansion tank from lower mounting; remove tank.

Refit

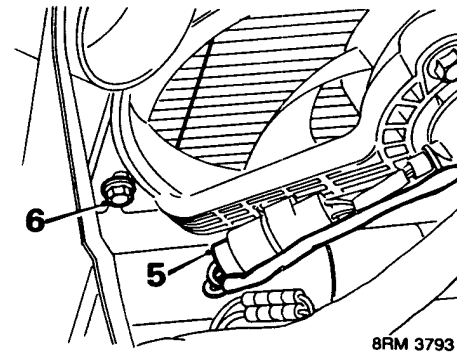
1. Position expansion tank to lower mounting.
2. Connect 3 hoses to expansion tank; tighten 3 clips.
3. Align expansion tank to bulkhead; fit and tighten 2 screws.
4. Connect low coolant level switch multiplug.
5. Refill cooling system, see **MAINTENANCE.**

COOLING FAN, MOTOR AND COWL

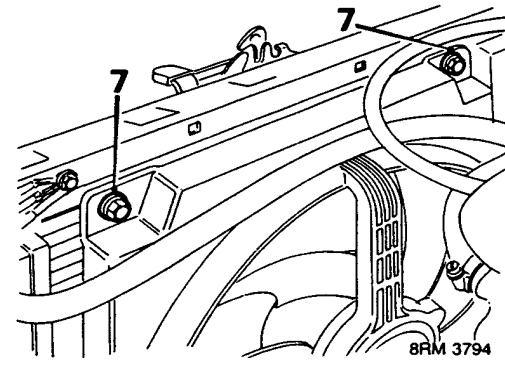
Remove

Cooling fan, motor and cowl assembly

1. Disconnect both battery leads.
2. Remove bolt and battery clamp; lift out battery
3. Remove air cleaner - see **FUEL SYSTEM - Repairs**
4. Remove under belly panel - see **REPAIR MANUAL - BODY - Repairs**

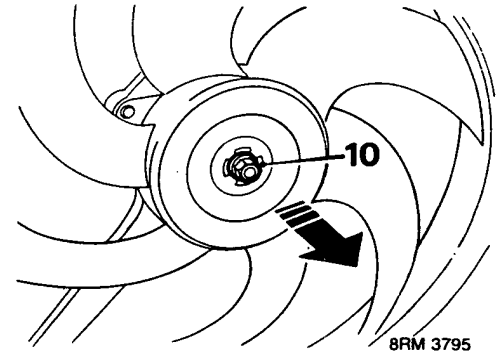


5. Disconnect cooling fan motor multiplug.
6. Slacken but do not remove 2 screws securing bottom of cowl.



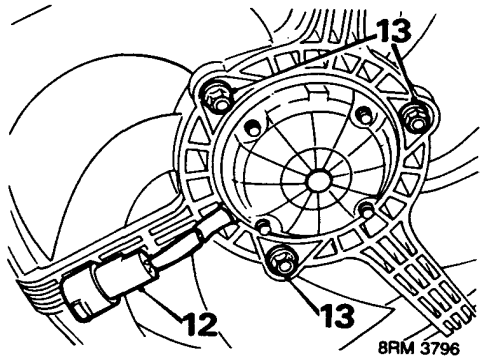
7. Remove 2 screws securing top of cowl to bonnet support.
8. Release slots in bottom of cowl from securing screws.
9. Remove cooling fan, motor and cowl assembly.

Cooling fan



10. Remove nut securing cooling fan.
11. Pull cooling fan from fan motor spindle.

Motor



12. Release multiplug from clip on cowl.
13. Remove 3 nuts securing motor to cowl.
14. Release motor from cowl.

Refit

Motor

1. Position motor to cowl.
2. Fit nuts and tighten to 4 Nm.
3. Secure multiplug to clip on cowl.

Cooling fan

4. Position cooling fan to motor spindle.
5. Fit nut and tighten to 25 Nm.

Cooling fan, motor and cowl assembly

6. Position assembly to radiator, locate slots in bottom of cowl over bottom securing screws.

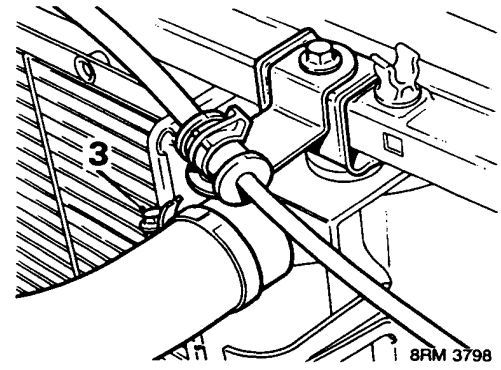
Note: Do not tighten screws at this stage.

7. Position top of cowl; fit and tighten screws securing top of cowl to radiator support.
8. Tighten screws securing bottom of cowl.
9. Connect multiplug.
10. Fit under belly panel – see **REPAIR MANUAL – BODY – Repairs**
11. Fit air cleaner – see **FUEL SYSTEM – Repairs.**
12. Fit battery into tray, fit clamp and tighten bolt, connect both battery leads.

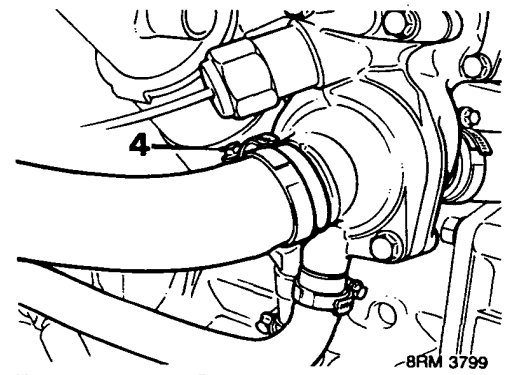
RADIATOR

Remove

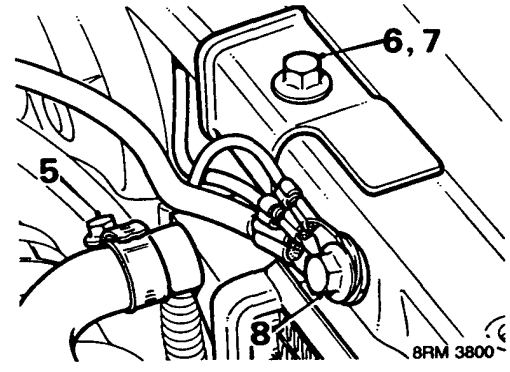
1. Drain cooling system, see **MAINTENANCE.**
2. Remove cooling fan, motor and cowl.



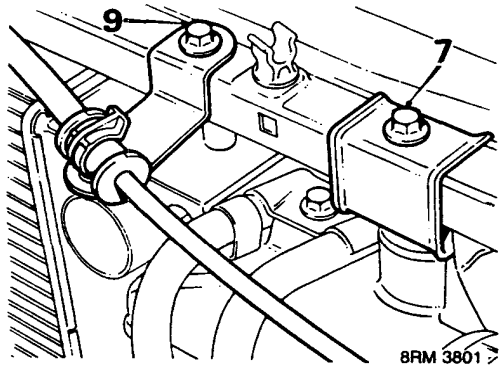
3. Slacken clip, disconnect top hose from radiator.



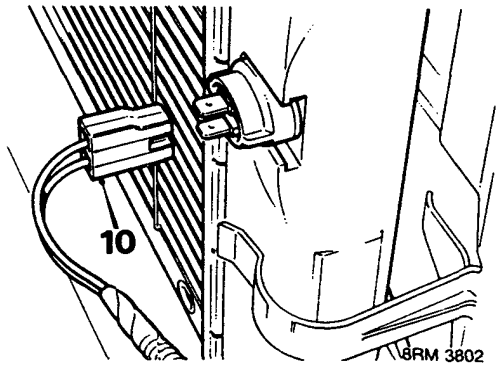
4. *Turbo Models:* Slacken clip, disconnect bottom hose from thermostat housing.



5. Slacken clip, disconnect overflow hose from radiator.
6. *Turbo Models:* Remove bolt securing radiator support bracket to bonnet platform; release bracket from radiator.
7. *Non – Turbo Models:* Remove bolt securing each radiator support bracket to bonnet platform; release brackets from radiator.
8. Remove screw securing 3 earth leads to bonnet platform.

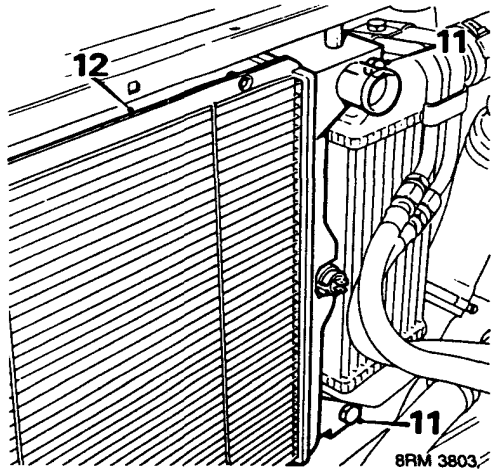


9. Remove screw securing throttle cable clip to bonnet platform; move cable aside.



10. Disconnect cooling fan switch multiplug.

Turbo Models

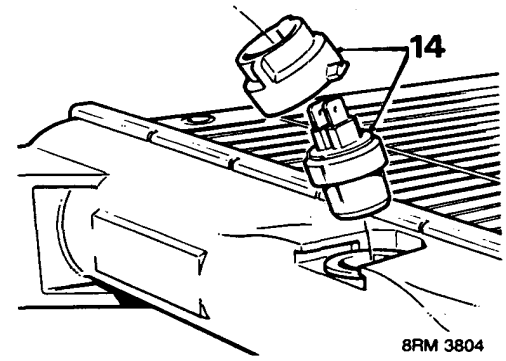


11. Remove 2 bolts securing radiator to intercooler.
12. Release radiator from intercooler.

All Models

13. Remove radiator; recover 2 mounting rubbers.

Do not carry out further dismantling if component is removed for access only



14. Remove locking ring securing cooling fan switch; remove switch.

Refit

1. Check mounting rubbers for damage, replace as necessary.
2. Fit mounting rubbers to radiator.
3. Fit cooling fan switch to radiator; fit and tighten locking ring.
4. *Non - Turbo Models:* Position radiator to mountings.

Turbo Models

5. Position radiator to mountings and intercooler.
6. Fit bolts securing radiator to intercooler tighten bolts to 12 Nm.

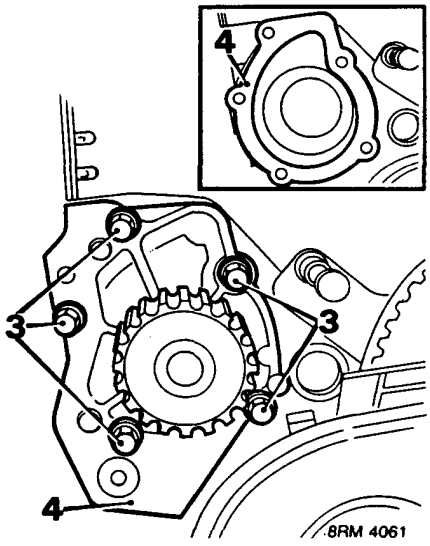
All Models

7. Connect cooling fan switch multiplug.
8. Position throttle cable clip to bonnet platform; fit and tighten screw.
9. *Turbo Models:* Position radiator support bracket to bonnet platform and radiator.
10. *Non - Turbo Models:* Position radiator support brackets to bonnet platform and radiator.
11. Fit support bracket bolts and tighten to 9 Nm.
12. Position earth leads to bonnet platform, fit and tighten screw.
13. Connect radiator top and bottom hoses; tighten hose clips.
14. *Turbo Models:* Connect bottom hose to thermostat housing.
15. Connect overflow hose to radiator; tighten clip.
16. Fit cooling fan, motor and cowl.
17. Refill cooling system, see **MAINTENANCE.**

COOLANT PUMP

Remove

1. Drain cooling system, see **MAINTENANCE.**
2. Remove timing belt, see **ENGINE - Repairs.**



3. Remove 5 bolts securing coolant pump.
4. Remove coolant pump, discard gasket.

Refit

1. Remove all traces of old gasket from coolant pump housing.
2. Position new gasket to coolant pump housing.
3. Fit coolant pump, fit bolts and tighten by diagonal selection to 15 Nm.
4. Fit timing belt, see **ENGINE - Repairs.**
5. Refill cooling system, see **MAINTENANCE.**

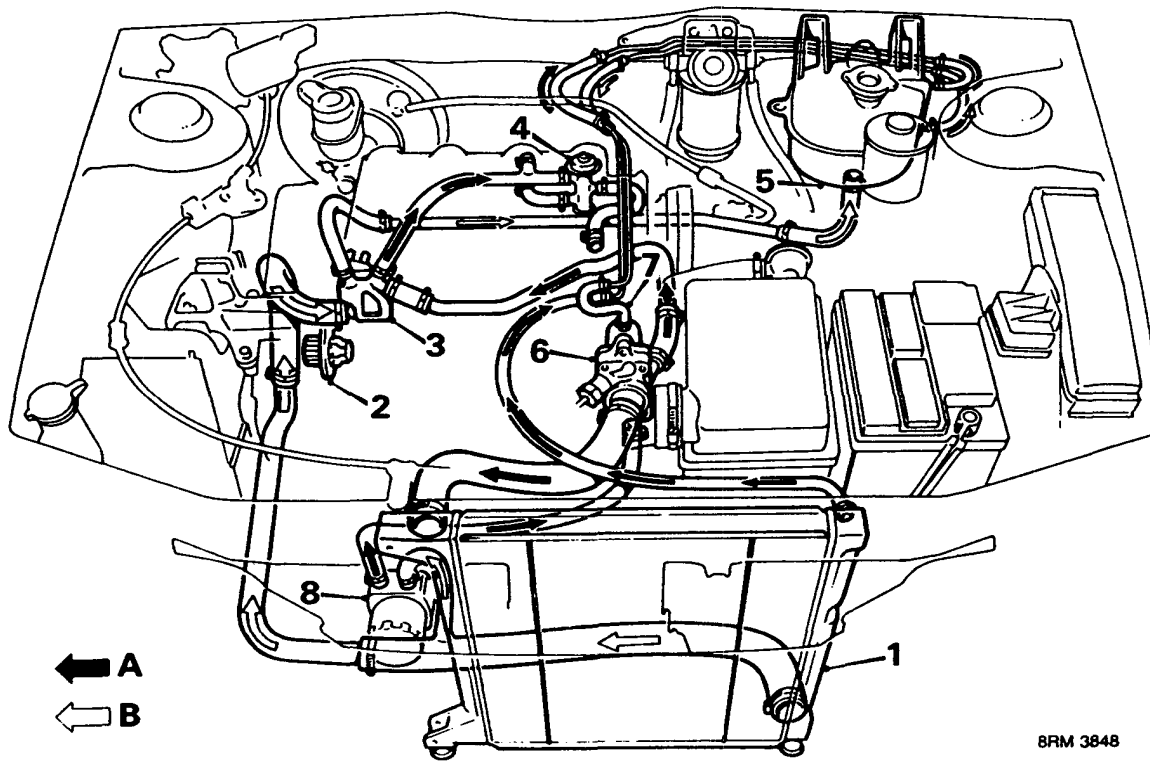
TORQUE SETTINGS

Intercooler to radiator bolts	12 Nm
Radiator support bracket bolts	9 Nm
Fan motor to cowl nuts	4 Nm
Fan to motor spindle nut	25 Nm
Thermostat housing cover bolts	12 Nm
Coolant pump bolts	15 Nm

FAULT FINDING

COMPLAINT

- Engine overheating
- Engine runs cold



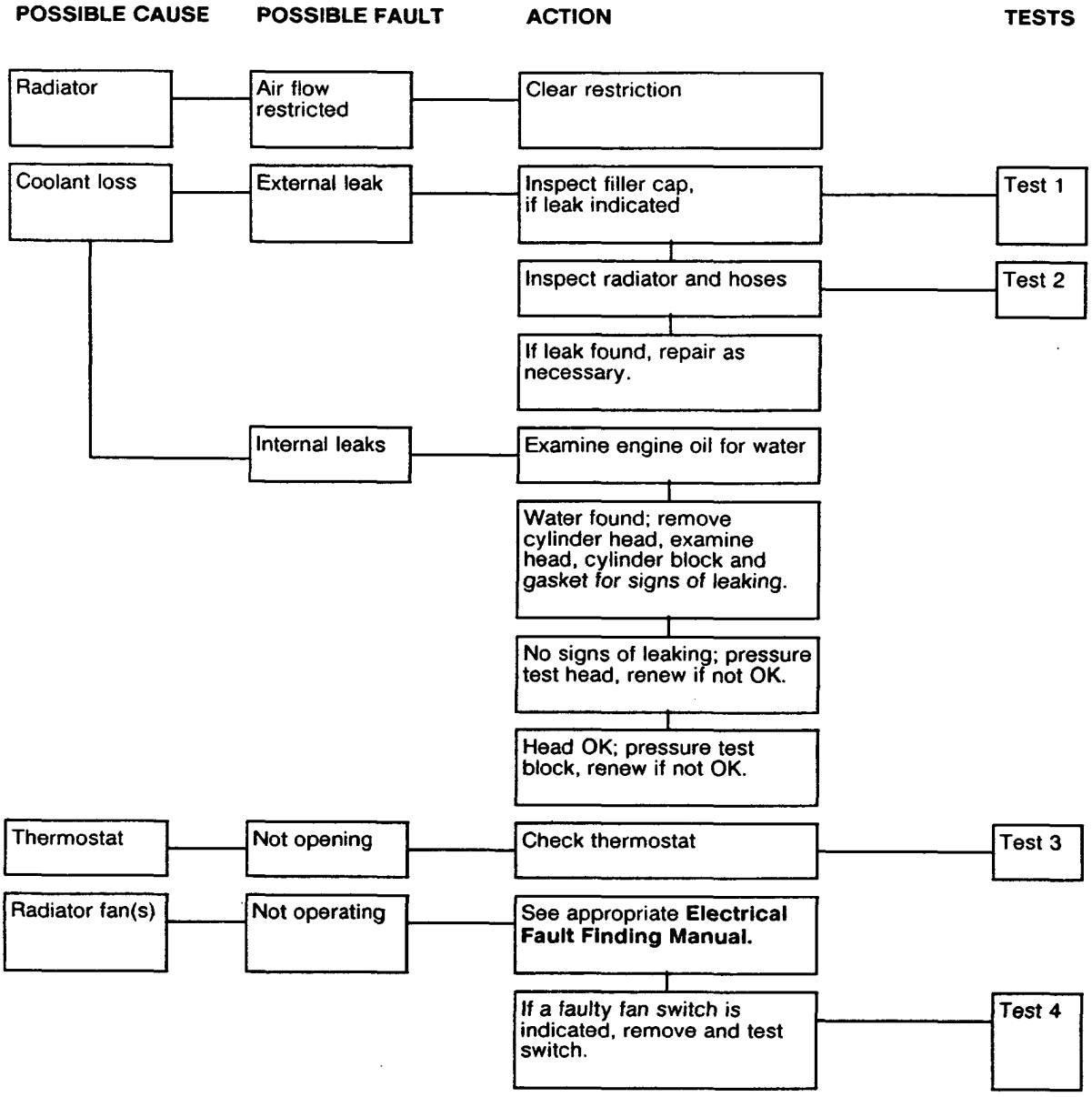
COMPONENT LOCATION

1. Radiator
2. Coolant pump
3. Fuel heater
4. Heater valve
5. Expansion tank
6. Thermostat
7. Thermostat housing bleed hose
8. Oil cooler (naturally aspirated engines)

A = Hot

B = Cold

COMPLAINT – Engine overheating

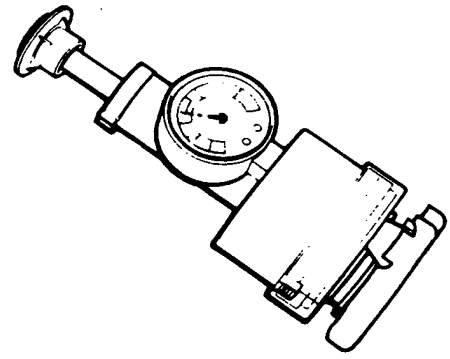


COMPLAINT – Engine runs cold

POSSIBLE CAUSE	POSSIBLE FAULT	ACTION	TESTS
Radiator fan(s)	Operating continuously	See appropriate **Electrical Fault Finding Manual.**	
		If a faulty fan switch is indicated, remove and test switch.	Test 4
Thermostat	Permanently open	Check thermostat. If open at ambient temperature, renew.	

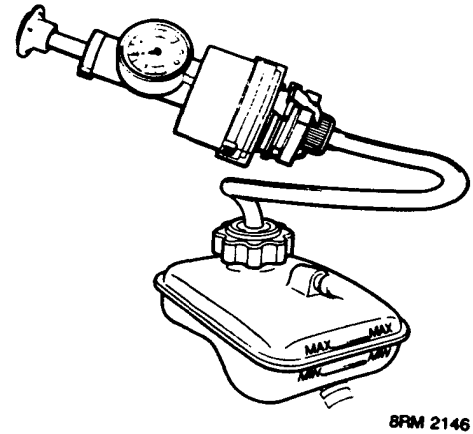
Test 1
Pressure cap

1. Wet filler cap seal with coolant and fit to pressure test equipment.
2. Apply a pressure of 0.90 – 1.0 bar.
3. There should be no pressure drop.



Test 2
Radiator and hoses

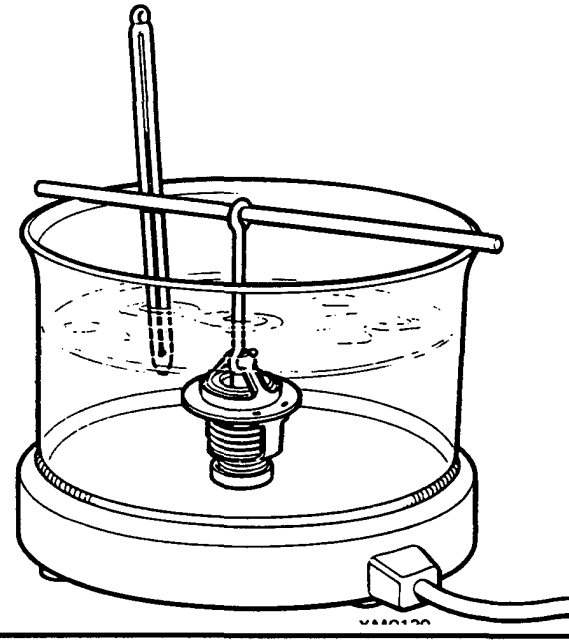
1. With engine cold, fill expansion tank to normal level.
2. Fit pressure test equipment to expansion tank and apply a pressure of 0.90 – 1.0 bar.
3. There should be no leaks and no pressure drop.



Test 3
Thermostat

1. *If thermostat is open at ambient temperature,* renew it.
2. Suspend closed thermostat in a container of cold water.
3. Suspend a thermometer in the water.
4. Heat the water and check the temperature at which the thermostat commences to open. Check liftheight when thermostat is fully open.

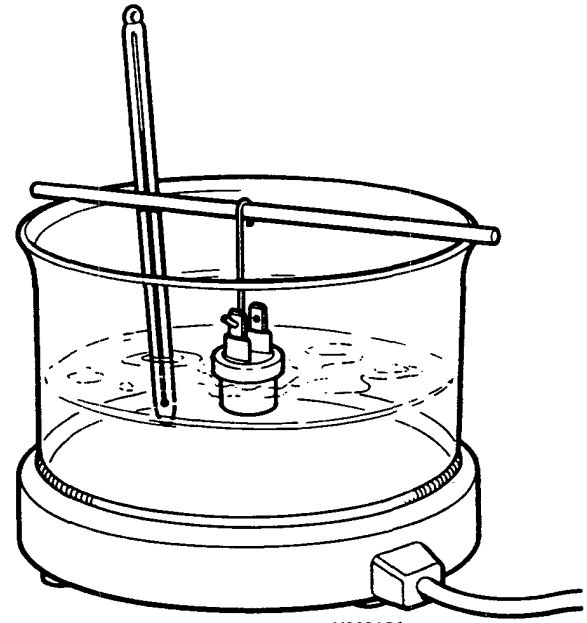
   Opening temperature = 88°C
   Fully open temperature = 97°C
   Full lift height = 7.5 mm



Test 4
Fan switch

1. Suspend temperature switch in a container of cold water.
2. Suspend a thermometer in the water.
3. Connect a test light and battery between the switch contacts.
4. Heat water and check when light switches on. Allow water to cool and check when light switches off.

   Light should switch on = 92° - 99°C
   Light should switch off = 88° - 95°C
   Difference between on and off = 4°C minimum
5. If switch does not comply with these figures, renew it.



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