

Chapter 3

Cooling, heating and ventilation systems

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Degrees of difficulty

Easy , suitable for novice with little experience 	Fairly easy , suitable for beginner with some experience 	Fairly difficult , suitable for competent DIY mechanic 	Difficult , suitable for experienced DIY mechanic 	Very difficult , suitable for expert DIY or professional 
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Specifications

General

Radiator cap opening pressure 0.78 to 0.98 bar (11.0 to 14.0 psi)

Thermostat

Opening temperature:
 Phase I and Phase II models:
 Starts to open:
 All except 1.6 litre fuel injection engines 76.5°C
 1.6 litre fuel injection engines 82°C
 Fully open:
 All except 1.6 litre fuel injection engines 90°C
 1.6 litre fuel injection engines 95°C
 Phase III models:
 Starts to open 82°C
 Fully open 95°C
 Maximum valve lift (approximate) 8.0 mm

Electric cooling fan

Cut-in temperature 82 to 88°C

Engine temperature sensor

Resistance:
 20°C 2.10 to 2.90 kilohms
 50°C 0.68 to 1.00 kilohms
 80°C 0.30 to 0.33 kilohms

Torque wrench settings

	Nm	lbf ft
Coolant pump pulley securing bolts	7	5
Coolant pump securing bolts: 1.6 litre engine	7	5
2.0 litre engine	18	13
Thermostat cover securing bolts	7	5
Thermostat housing securing bolts: 1.6 litre engine	7	5
2.0 litre engine	18	13

2 Cooling system hoses - disconnection and renewal

1 The number, routing and pattern of hoses will vary according to model, but the same basic procedure applies. Before commencing work, make sure that the new hoses are to hand, along with new hose clips if needed. It is good practice to renew the hose clips at the same time as the hoses.

2 Drain the cooling system, as described in Chapter 1, saving the coolant if it is fit for re-use. Squirt a little penetrating oil onto the hose clips if they are corroded.

3 Release the hose clips from the hose concerned. Three types of clip are used; worm-drive, spring and sardine-can. The worm-drive clip is released by turning its screw anti-clockwise. The spring clip is released by squeezing its tags together with pliers, at the same time working the clip away from the hose stub. The sardine-can clip is not re-usable, and is best cut off with snips or side cutters.

4 Unclip any wires, cables or other hoses which may be attached to the hose being removed. Make notes for reference when reassembling if necessary.

5 Release the hose from its stubs with a twisting motion. Be careful not to damage the stubs on delicate components such as the radiator. If the hose is stuck fast, the best course is often to cut it off using a sharp knife, but again be careful not to damage the stubs.

6 Before fitting the new hose, smear the stubs with washing-up liquid or a suitable rubber lubricant to aid fitting. Do not use oil or grease, which may attack the rubber.

7 Fit the hose clips over the ends of the hose, then fit the hose over its stubs. Work the hose into position. When satisfied, locate and tighten the hose clips.

8 Refill the cooling system as described in

Chapter 1. Run the engine, and check that there are no leaks.

9 Recheck the tightness of the hose clips on any new hoses after a few hundred miles.

10 Top-up the coolant level if necessary.

3 Radiator - removal, inspection and refitting

Removal

Note: If leakage is the reason for removing the radiator, bear in mind that minor leaks can often be cured using a radiator sealant with the radiator *in situ*.

1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

2 Drain the cooling system as described in Chapter 1.

3 Disconnect the remaining coolant hose(s) from the radiator (on models with automatic transmission, the fluid cooler hoses are connected to the bottom of the radiator) (see illustration).

4 To improve the clearance available, remove the cooling fan(s) and shroud assembly, as described in Section 5. On models with air conditioning, unbolt the refrigerant pipe support bracket from the side of the radiator.

5 Working at the top of the radiator, unscrew the bolts/nuts securing the radiator mounting brackets to the upper body panel (see illustration).

6 Withdraw the mounting brackets, and recover the upper mounting rubbers if they are loose.

7 Carefully tilt the radiator back towards the engine, then lift the radiator from the engine compartment (see illustration). Recover the lower mounting rubbers if they are loose.

Inspection

8 If the radiator has been removed due to



3.3 Disconnecting the radiator top hose

suspected blockage, reverse-flush it as described in Chapter 1. Clean dirt and debris from the radiator fins, using an air line (in which case, wear eye protection) or a soft brush. Be careful, as the fins are sharp, and easily damaged.

9 If necessary, a radiator specialist can perform a flow test on the radiator, to establish whether an internal blockage exists.

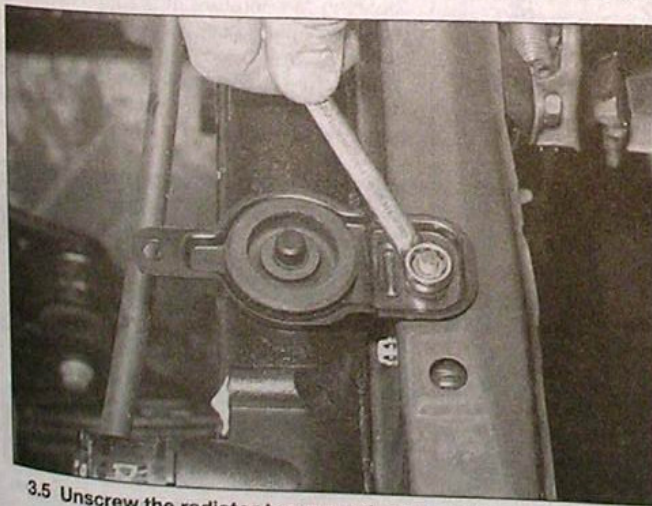
10 A leaking radiator must be referred to a specialist for permanent repair. Do not attempt to weld or solder a leaking radiator, as damage to the plastic components may result. In an emergency, minor leaks from the radiator can be cured by using a suitable radiator sealant, in accordance with its manufacturer's instructions, with the radiator *in situ*.

11 Inspect the condition of the radiator mounting rubbers, and renew them if necessary.

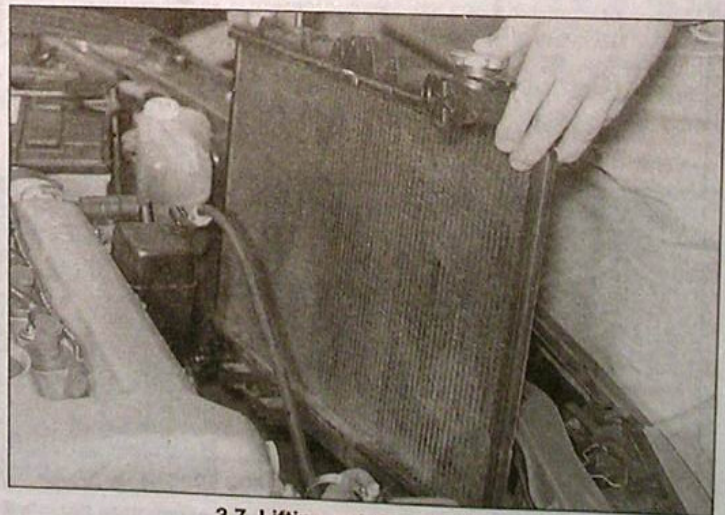
Refitting

12 Refitting is a reversal of removal, bearing in mind the following points:

- Ensure that the radiator lower lugs engage correctly with the lower mounting rubbers.
- On completion, refill the cooling system as described in Chapter 1.



3.5 Unscrew the radiator top mounting bracket securing bolts



3.7 Lifting out the radiator

Refitting

13 Commence refitting by thoroughly cleaning the mating faces of the cover and the housing.

14 Refit the thermostat to the housing, noting that it should fit with the bleed valve uppermost (see illustration).

15 Apply a continuous bead of sealant (liquid gasket) to the housing mating face of the thermostat cover, taking care not to apply excess sealant, which may enter the cooling system (see illustration).

16 Fit the cover to the thermostat housing, then refit the securing bolts, and tighten to the specified torque.

17 Where applicable, fit the wiring harness to the clip on the thermostat cover, and on 1.6 litre engine models, reconnect the wiring plug to the cooling fan switch.

18 Reconnect the coolant hose to the thermostat cover.

19 Refill the cooling system as described in Chapter 1.

20 Reconnect the battery negative terminal.

5 Electric cooling fan(s) - testing, removal and refitting

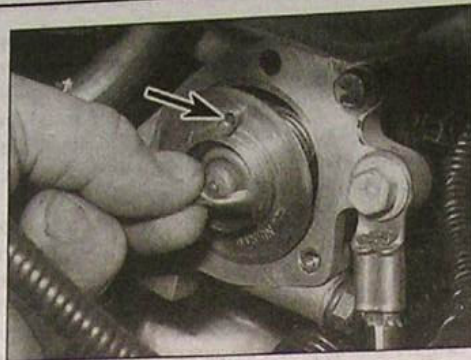
**Testing**

1 Current supply to the cooling fan(s) is via the ignition switch and a fuse (see Chapter 12). On all except 1.6 litre carburettor engines, the circuit is completed by the engine temperature sensor, via the engine management electronic control unit. The sensor is located in the inlet manifold, at the rear (timing chain end) of the cylinder head. On 1.6 litre carburettor engines, the circuit is completed by the cooling fan switch, which is located in the thermostat cover, bolted to the coolant pump at the timing chain end of the engine. On models with air conditioning and/or automatic transmission, two cooling fans are fitted.

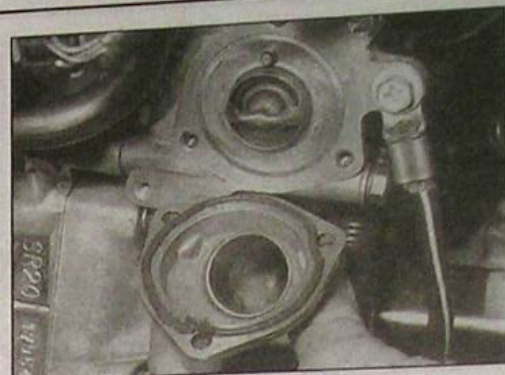
2 Detailed fault diagnosis can be carried out by a Nissan dealer using suitable test equipment, but basic diagnosis can be carried out as follows.



5.7 Disconnecting a cooling fan motor wiring connector



4.14 Thermostat bleed valve (arrowed) must be uppermost



4.15 Apply a bead of sealant to the thermostat cover

3 If the fan does not appear to work, run the engine until normal operating temperature is reached, then allow it to idle. The fan should cut in within a few minutes (before the temperature gauge needle enters the red section). If not, switch off the ignition and disconnect the cooling fan motor wiring connector.

4 The motor can be tested by disconnecting it from the wiring loom, and connecting a 12-volt supply directly to it. The motor should operate - if not, the motor, or the motor wiring, is faulty.

5 If the motor operates when tested as described in paragraph 4, the fault must lie in the engine wiring harness, the engine management electronic control unit, or the temperature sensor. The temperature sensor/switch can be tested as described in Section 6. Any further fault diagnosis should be referred to a suitably-equipped Nissan dealer - do not attempt to test the electronic control unit.

Removal

6 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

7 Disconnect the motor wiring connector(s) (see illustration).

8 Unscrew the two securing screws from the top of the shroud, then lift out the assembly to release the lower clips (see illustrations).

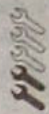
Refitting

9 Refitting is a reversal of removal.



5.8a Remove the two securing screws ...

6 Cooling system electrical switches - testing, removal and refitting



Cooling fan switch - 1.6 litre carburettor engines

Testing

1 The switch is located in the end of the thermostat cover, on the end of the coolant pump, at the timing chain end of the engine.

2 The switch can be tested by removing it, and checking that the switching action occurs at the correct temperature (heat the sensor in a container of water, and monitor the temperature with a thermometer).

3 There should be no continuity between the switch terminals, until the specified cooling fan cut-in temperature is reached, when continuity (and zero resistance) should exist between the terminals.

Removal

4 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

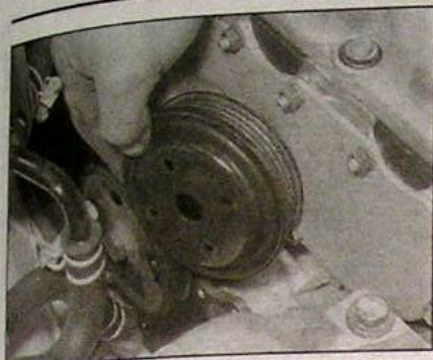
5 Partially drain the cooling system to just below the level of the sensor (as described in Chapter 1). Alternatively, have ready a suitable bung to plug the aperture in the housing when the sensor is removed.

6 Disconnect the wiring plug from the sensor.

7 Carefully unscrew the sensor and, where applicable, recover the sealing ring. If the



5.8b ... and lift out the cooling fan assembly



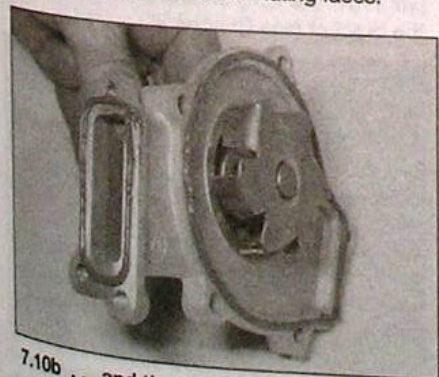
7.4 Removing the coolant pump pulley - 1.6 litre engine

7 Coolant pump - removal, inspection and refitting

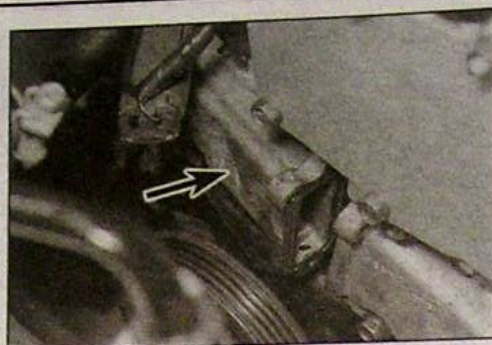
1.6 litre engines

Removal

- 1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).
- 2 Drain the cooling system as described in Chapter 1.
- 3 Remove the auxiliary drivebelt(s) as described in Chapter 1.
- 4 Unscrew the securing bolts, and remove the coolant pump pulley (see illustration). It will be necessary to counterhold the pulley in order to unscrew the bolts, and this is most easily achieved by wrapping an old drivebelt tightly around the pulley to act in a similar manner to a strap wrench.
- 5 Unbolt the thermostat housing from the stub on the coolant pump, and move the housing to one side, taking care not to strain the sensor/switch wiring (see illustration). If the housing is stuck, tap it gently with a soft-faced mallet - **do not** lever between the mating faces. If necessary to improve access, disconnect the wiring and the coolant hose, and remove the housing.
- 6 Unscrew the securing bolts, and withdraw the coolant pump. If the pump is stuck, tap it gently using a soft-faced mallet - **do not** lever between the pump and cylinder block mating faces.



7.10b ... and thermostat housing mating face - 1.6 litre engine



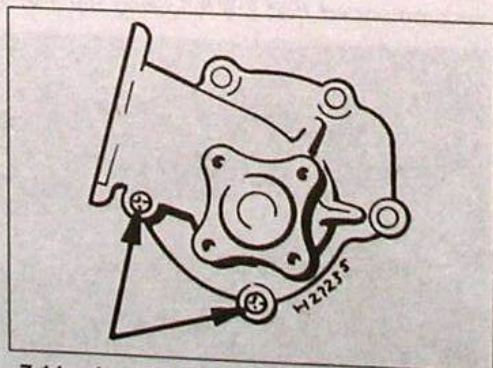
7.5 Unbolt the thermostat housing (arrowed) from the coolant pump - 1.6 litre engine

Inspection

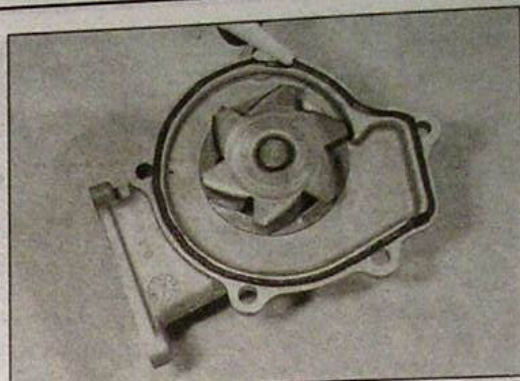
- 7 Check the pump body and impeller for signs of excessive corrosion. Turn the impeller, and check for stiffness due to corrosion, or roughness due to excessive end play.
- 8 No spare parts are available for the pump, and if faulty, worn or corroded, a new pump should be fitted.

Refitting

- 9 Commence refitting by thoroughly cleaning all traces of sealant from the mating faces of the pump and cylinder block, and from the thermostat housing.
- 10 Apply a continuous bead of sealant (liquid gasket) to the cylinder block mating face of the pump, taking care not to apply excessive sealant, which may enter the pump itself. Similarly, apply a bead of sealant to the thermostat housing mating face of the pump (see illustrations).
- 11 Place the pump in position in the cylinder block, then refit and tighten the bolts. Note that the threads of the two lower bolts should be coated with thread-locking compound (see illustrations).
- 12 Refit the pump pulley, then refit the securing bolts and tighten to the specified torque. Counterhold the pulley using an old drivebelt as during removal.
- 13 Apply a continuous bead of sealant (liquid gasket) to the coolant pump mating face of the thermostat housing, again taking care not to apply excessive sealant.



7.11a Apply thread-locking compound to the two coolant pump lower securing bolts (arrowed) - 1.6 litre engine



7.10a Apply sealant to the coolant pump's cylinder block mating face ...

- 14 Place the thermostat housing in position on the pump stub, then refit the securing bolts, and tighten to the specified torque.
- 15 Refit and tension the auxiliary drivebelt(s) as described in Chapter 1.
- 16 Refill the cooling system as described in Chapter 1.
- 17 Reconnect the battery negative terminal.

2.0 litre engines

18 The procedures are as described previously in this Section for 1.6 litre engines, noting the following differences:

- a) Remove the power steering pump as described in Chapter 10.
- b) Ignore the references to unbolting the thermostat housing from the pump, which is not applicable to the 2.0 litre engine.
- c) There is no need to apply sealant to the lower coolant pump securing bolts on 2.0 litre engines.

8 Heater/ventilation system - general information

- 1 The heater/ventilation system consists of a four-speed blower motor (housed behind the facia), face level vents in the centre and at each end of the facia, and air ducts to the front footwells.
- 2 The control unit is located in the facia, and the controls operate flap valves to deflect and mix the air flowing through the various parts of the heating/ventilation system. The flap valves



7.11b Refitting the coolant pump - 1.6 litre engine

17 Working at the passenger's side of the car, disconnect the wiring plugs from the heater blower motor, the blower motor resistor, and the air flap motor (see illustrations).

18 Unscrew the upper bolt, and the two lower nuts, securing the heater motor casing, then remove the two screws securing the motor unit ducting to the main heater unit, and withdraw the heater blower motor casing from the scuttle (see illustrations).

19 Remove the complete fascia assembly as described in Chapter 11A.

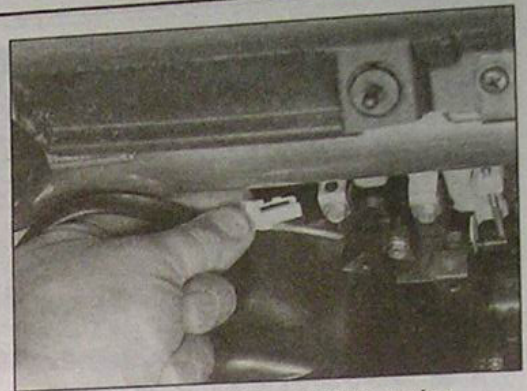
20 Withdraw the heater/ventilation control unit forwards from the fascia, and disconnect the wiring plugs from the rear of the unit.

21 Pull out the securing clip, and disconnect the temperature control cable from the lever on the rear of the heater/ventilation control unit, then withdraw the unit.

22 Working at the centre of the fascia, remove the securing screws, and withdraw the



9.17a Disconnecting the wiring plug from the blower motor resistor ...



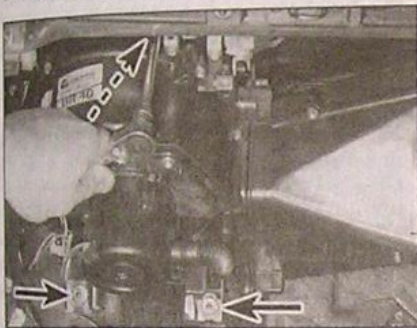
9.17b ... and the air flap motor

electronic control unit from the fascia centre brackets (see illustrations). Disconnect the wiring plug and withdraw the control unit.

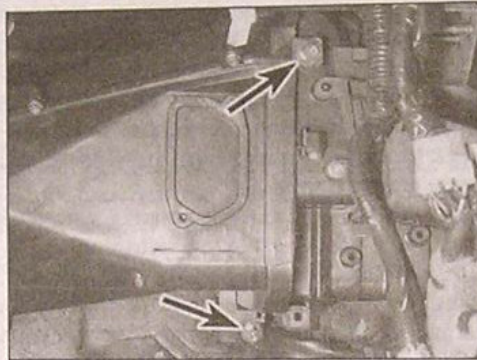
23 Unclip and wiring plugs, connectors, and/or harnesses from the left-hand fascia

metal centre bracket, noting their locations (see illustration).

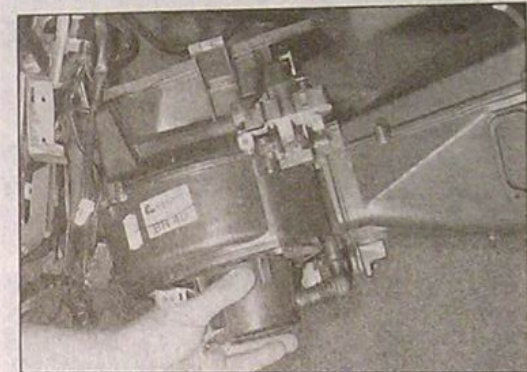
24 Remove the two upper nuts, and the two lower screws, and withdraw the left-hand fascia centre bracket (see illustrations).



9.18a Unscrew the upper bolt and the two lower nuts (arrowed) securing the motor casing ...



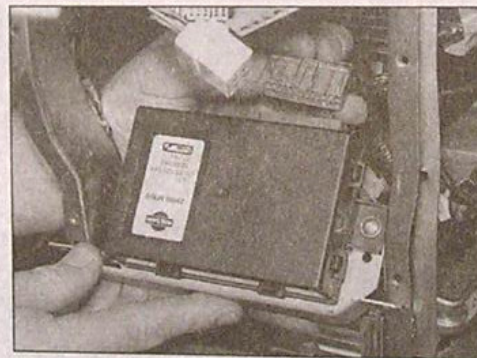
9.18b ... and the two screws (arrowed) securing the motor unit ducting ...



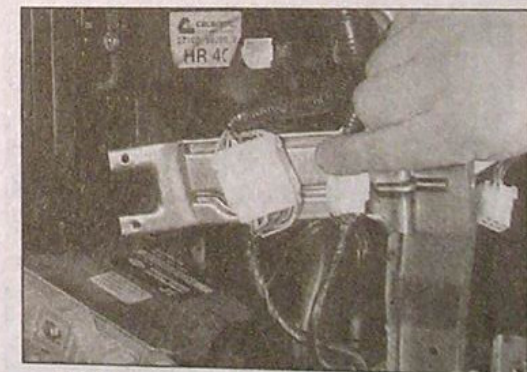
9.18c ... and withdraw the motor casing



9.22a Remove the securing screws ...



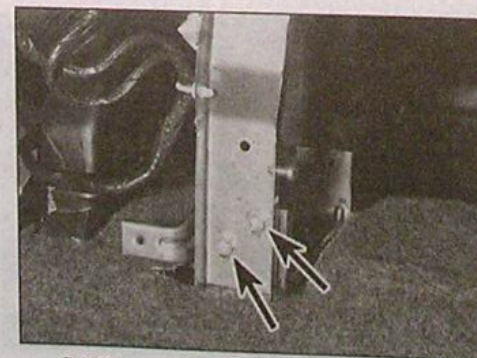
9.22b ... and withdraw the electronic control unit



9.23 Unclip the wiring connectors ...



9.24a ... then remove the two upper nuts (arrowed) ...



9.24b ... and the two lower screws (arrowed) ...



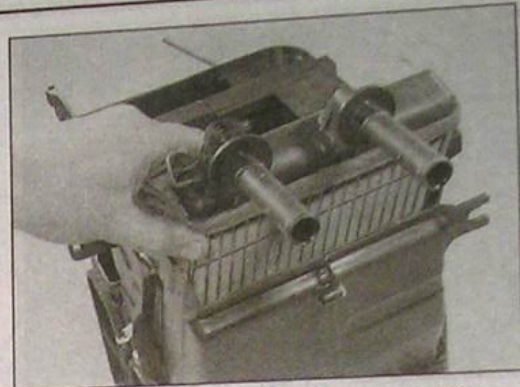
9.24c ... and withdraw the left-hand metal bracket



9.35 Remove the heater matrix retaining clip



9.36 Disconnect the actuating rod from the lever on the heater assembly air flap



9.38 Withdrawing the heater matrix

Heater matrix

Removal

- 34 Remove the complete heater assembly as described previously in this Section.
- 35 Remove the plastic heater matrix retaining clip from the end of the heater assembly (see illustration).
- 36 Release the securing clip, and disconnect the actuating rod from the lever on the heater assembly air flap (see illustration).
- 37 Unhook the actuating rod spring from the water valve lever on the heater matrix, and withdraw the actuating rod.
- 38 Withdraw the heater matrix from the heater assembly casing (see illustration).

Refitting

- 39 Refitting is a reversal of removal, but refit the heater assembly as described previously in this Section.

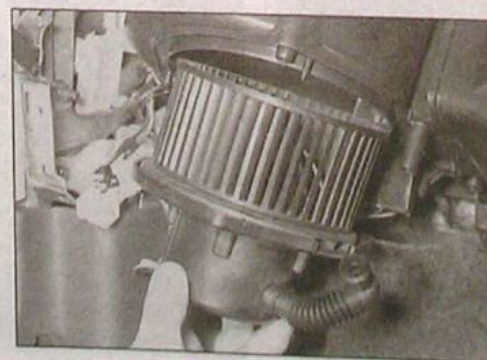
Heater blower motor

Removal

- 40 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).
- 41 Working under the glovebox, remove the two securing screws (one on each side of the glovebox), then lower the glovebox from the fascia.
- 42 Remove the three securing screws, and withdraw the passenger's side lower fascia panel from the fascia.
- 43 Remove the securing screws, and



9.45a ... then remove the securing screws ...



9.45b ... and withdraw the motor assembly



9.44 Disconnect the air hose from the motor casing ...

withdraw the metal reinforcing bracket which fits across the glovebox aperture.

- 44 Disconnect the cooling air hose from the bottom of the motor casing (see illustration).
- 45 Remove the two securing screws, noting the locations of any brackets secured by the screws, then withdraw the motor assembly from the heater casing (see illustrations).

Refitting

- 46 Refitting is a reversal of removal, but ensure that any brackets are positioned as noted before removal, and make sure that the cooling air hose is reconnected.

Heater blower motor resistor

Removal

- 47 The resistor is located at the bottom of the heater casing, behind the blower motor.
- 48 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).
- 49 Working under the glovebox, remove the two securing screws (one on each side of the glovebox), then lower the glovebox from the fascia.
- 50 For improved access, proceed as described in paragraphs 42 and 43.
- 51 Disconnect the wiring plug from the resistor.
- 52 Remove the two securing screws, and withdraw the resistor from the heater unit (see illustration).

Refitting

- 53 Refitting is a reversal of removal.

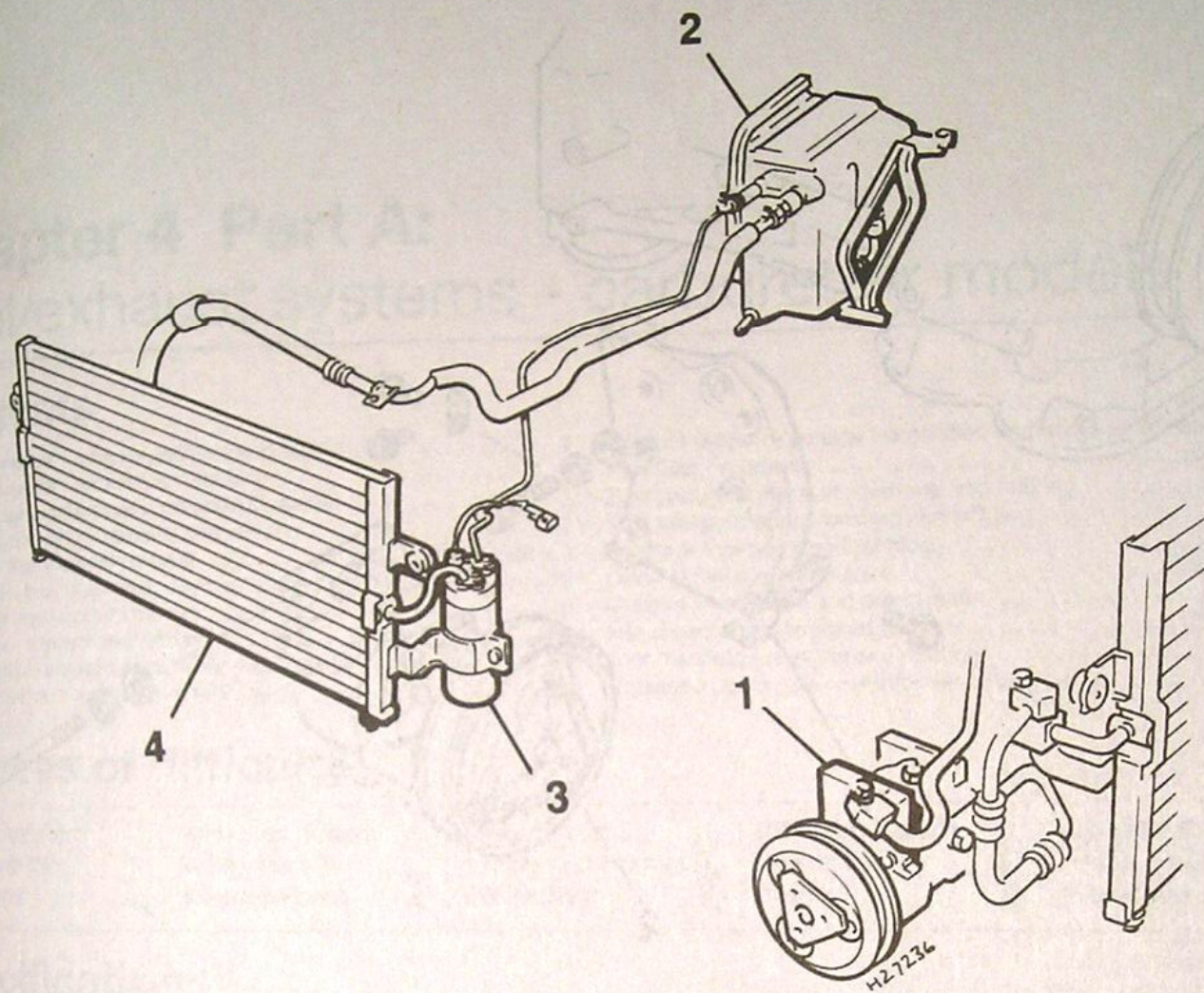
Heater air flap motors

Removal

- 54 Two air flap motors are fitted, one in the air inlet ducting next to the blower motor, and one on the right-hand side of the main heater casing.
- 55 For access to the motor in the air inlet ducting, proceed as described in paragraphs 41 to 43 inclusive.
- 56 For access to the motor on the main heater casing, remove the driver's side lower fascia panel, as described in Chapter 11A.
- 57 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).
- 58 To remove a motor, disconnect the wiring plug and the actuator rod from the motor



9.52 Removing the heater blower motor resistor



11.1 Air conditioning system components

1 Compressor

2 Evaporator unit

3 Receiver/drier bottle

4 Condenser

drop in temperature, which cools the evaporator. The refrigerant returns to the compressor, and the cycle begins again.

3 Air blown through the evaporator passes to the air distribution unit, where it is mixed with hot air blown through the heater matrix to achieve the desired temperature in the passenger compartment.

4 The heating side of the system works in the same way as on models without air conditioning (see Section 8).

5 The system is electronically-controlled. Any problems with the system should be referred to a Nissan dealer.

Precautions

6 With an air conditioning system, it is necessary to observe special precautions whenever dealing with any part of the system, or its associated components. If for any

reason the system must be disconnected, entrust this task to your Nissan dealer or a refrigeration engineer.



Warning: The refrigeration circuit contains a liquid refrigerant, and it is therefore dangerous to disconnect any part of the system without specialised knowledge and equipment. The refrigerant is potentially dangerous, and should only be handled by qualified persons. If it is splashed onto the skin, it can cause frostbite. It is not itself poisonous, but in the presence of a naked flame (including a cigarette) it forms a poisonous gas. Uncontrolled discharging of the refrigerant is dangerous, and potentially damaging to the environment.

7 Do not operate the air conditioning system if it is known to be short of refrigerant, as this may damage the compressor.

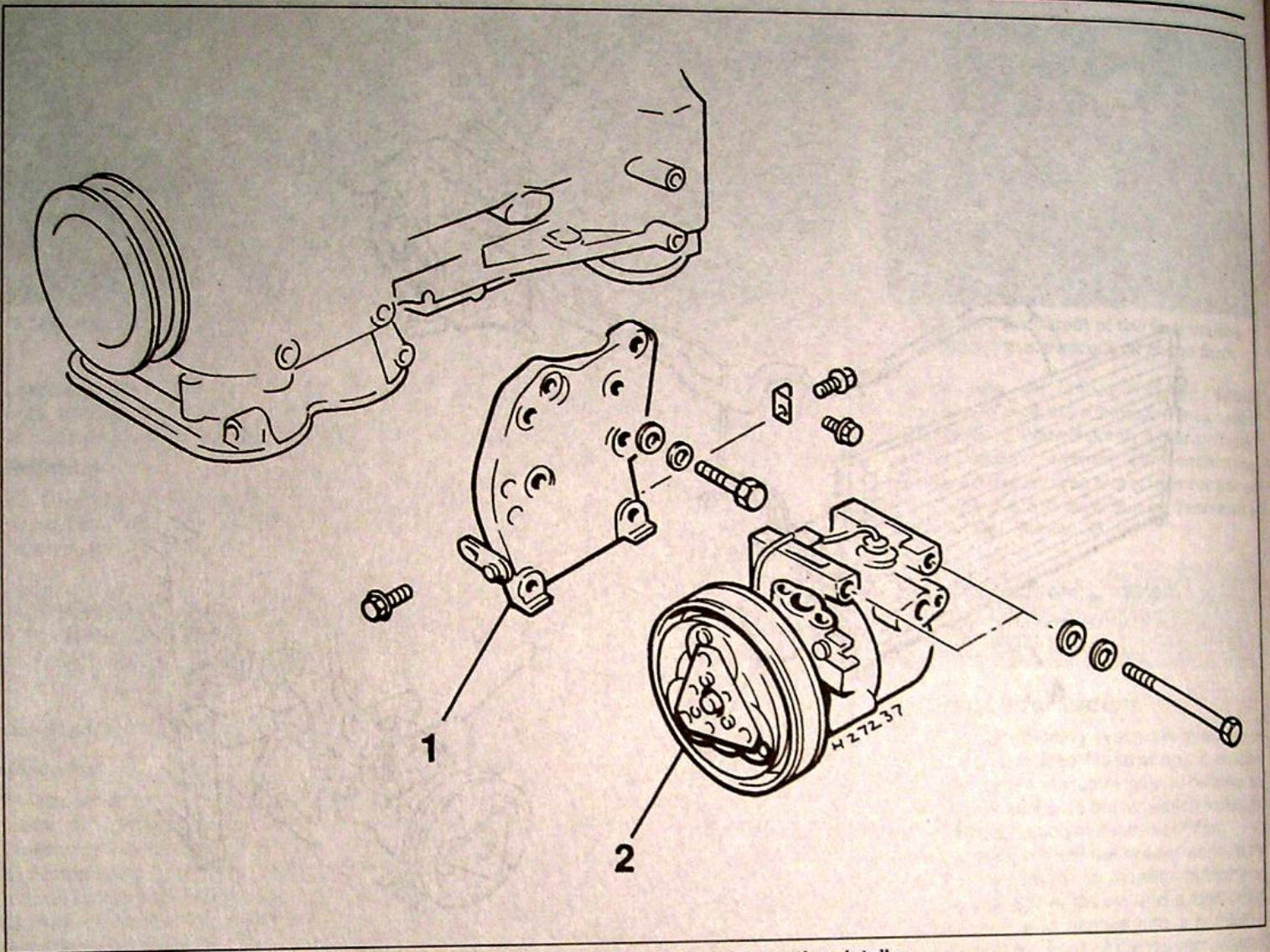
12 Air conditioning components - removal and refitting



Warning: Do not attempt to open the refrigerant circuit. Refer to the precautions given in Section 11.

1 The only operation which can be carried out easily without discharging the refrigerant is renewal of the compressor drivebelt which is described in Chapter 1. All other operations must be referred to a Nissan dealer or an air conditioning specialist.

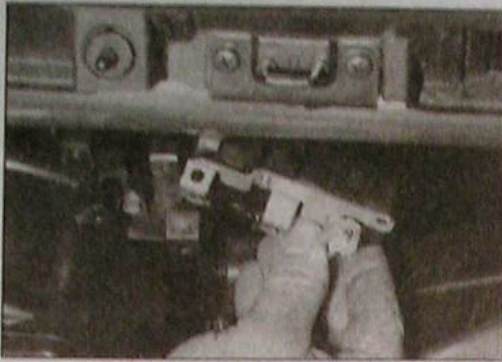
2 If necessary for access to other components, the compressor can be unbolted and moved aside, without disconnecting its flexible hoses, after removing the drivebelt (see illustration overleaf).



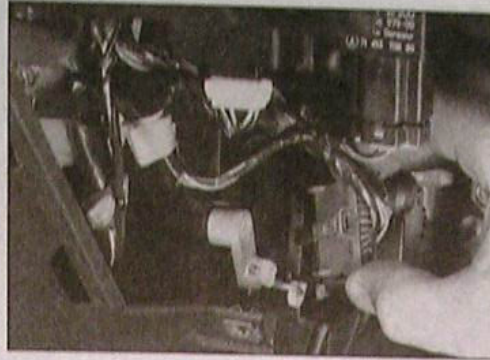
12.2 Air conditioning compressor mounting details -
do not disconnect refrigerant lines

1 Compressor mounting bracket

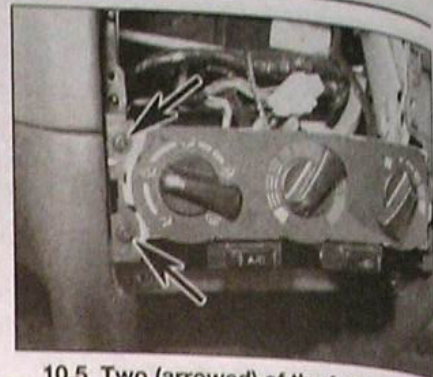
2 Compressor



9.58a Removing the inlet air flap actuator motor



9.58b Disconnecting the wiring plug from the main heater casing air flap motor



10.5 Two (arrowed) of the four screws securing the control unit to the fascia

assembly, then unscrew the two securing nuts, and withdraw the motor complete with its mounting bracket (see illustrations).

Refitting

59 Refitting is a reversal of removal, but make sure that the actuating rod is correctly reconnected to the motor.

10 Heater/ventilation components (Phase III models) - removal and refitting

Heater/ventilation control unit

Removal

- 1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).
- 2 Remove the fascia centre switch/ventilation nozzle housing as described in Chapter 11B.
- 3 Remove the passenger's side footwell centre kick panel by pulling out the edge adjacent to the fascia lower centre panel, then pulling the panel rearwards to disengage the retaining tongue. Remove the driver's side panel in the same way, but also remove the retaining clip. The clip is released by pushing in the centre pin then withdrawing the clip body.

4 Working under the fascia at the heater unit, mark the outer control cable locations with respect to the cable clips, then release the clips and disconnect the cables from the heater unit.

5 Undo the four screws securing the control unit to the fascia (see illustration).

6 Using a small screwdriver, prise the control unit to the left to release the locating lug, then manipulate the unit from its location (see illustrations).

7 Withdraw the control unit forwards from the fascia, and disconnect the wiring plugs from the rear of the unit.

Refitting

8 Refitting is a reversal of removal, ensuring that the control cables are refitted in the positions marked prior to removal. If adjustment is required, release the outer cable clips and move the heater controls to either their maximum or minimum positions. Move the operating levers on the heater unit to the corresponding positions, then refit the outer cable clips.

Heater assembly components

9 The majority of Phase III Primera models are equipped with air conditioning and the removal and refitting of the heater/ventilation

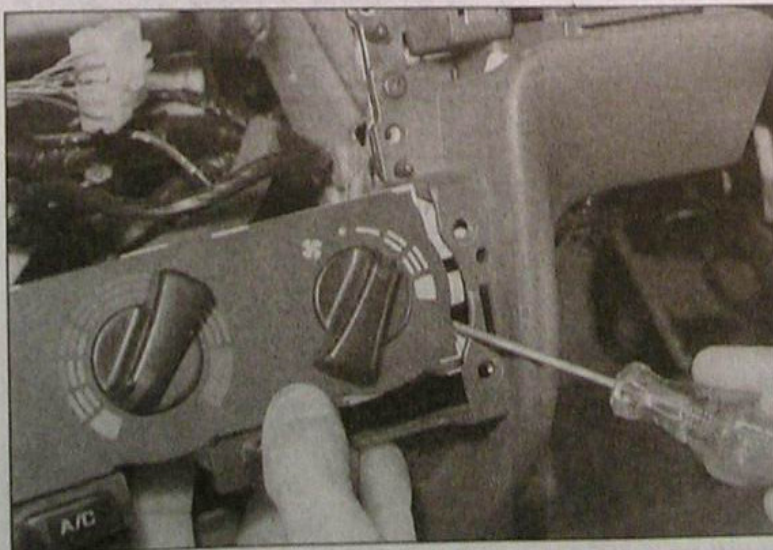
components on these models entails disconnection of the refrigerant lines, which should only be carried out by a Nissan dealer.

10 On models without air conditioning, access to the blower motor can be gained after removing the glovebox as described in Chapter 11B, Section 28.

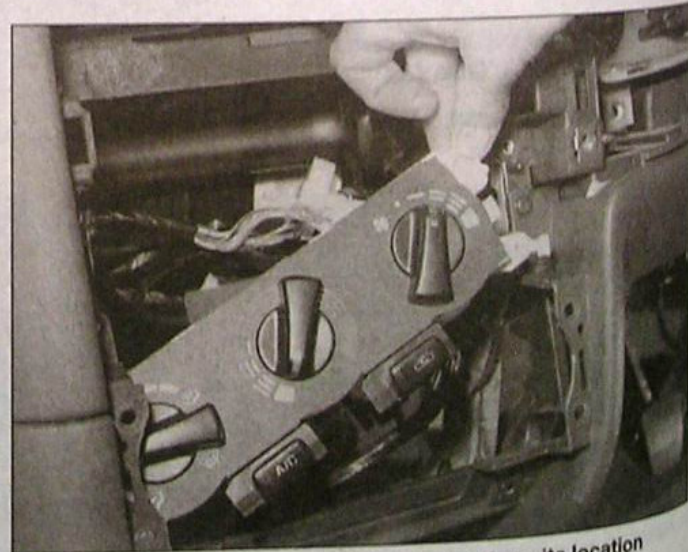
11 Air conditioning system - general information and precautions

General information

- 1 An air conditioning system is available on certain models (see illustration). It enables the temperature of incoming air to be lowered, and also dehumidifies the air, which makes for rapid demisting and increased comfort.
- 2 The cooling side of the system works in the same way as a domestic refrigerator. Refrigerant gas is drawn into a belt-driven compressor, and passes into a condenser mounted on the front of the radiator, where it loses heat and becomes liquid. The liquid passes through an expansion valve to an evaporator, where it changes from liquid under high pressure to gas under low pressure. This change is accompanied by a



10.6a Prise the control unit to the left to release the locating lug . . .



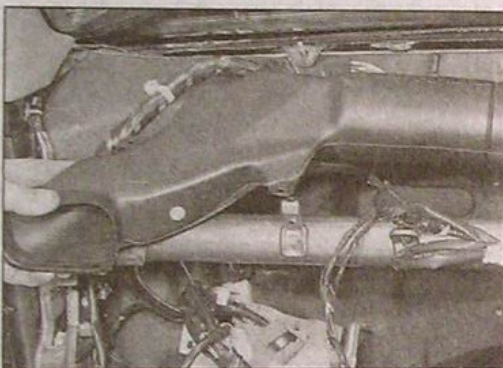
10.6b . . . then manipulate the unit from its location



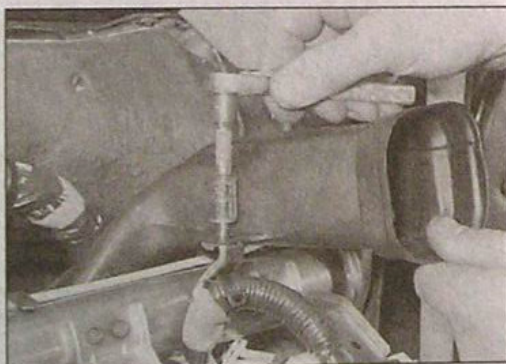
9.25 Removing the screw securing the wiring bracket to the right-hand metal bracket

25 Similarly, remove the right-hand facia metal centre bracket (see illustration).

26 Unclip the air ducting connecting the bottom of the heater assembly to the floor vents under the centre of the facia (see illustration).



9.28a Removing the left-hand side air duct



9.28b Unscrewing the right-hand side air duct securing screw



9.32b Heater assembly upper securing bolt (arrowed)



9.26 Unclip the air ducting from the centre of the heater assembly

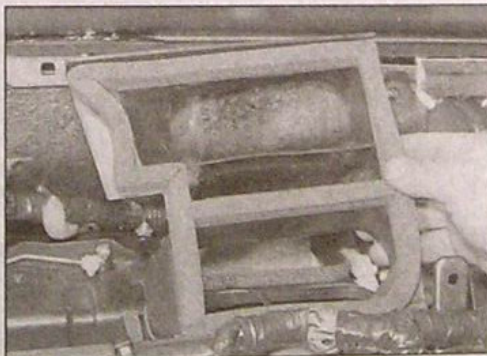
27 Unscrew the two front securing bolts, then withdraw the engine management electronic control unit, and disconnect the wiring plug (see illustration).

28 Where applicable, remove the securing screws, then disconnect the side air ducts from the heater unit. Withdraw the left-hand duct, manipulating it around the facia cross-tube. Pull the right-hand duct away from the heater assembly (the duct cannot be removed due to the proximity of the steering column (see illustrations).

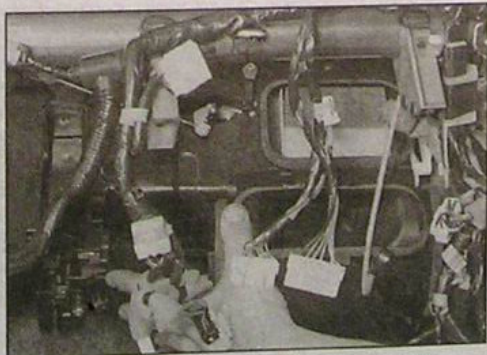
29 Unclip the air ducting connector from the top of the heater unit (see illustration).

30 Working in the engine compartment, slacken the hose clips, and disconnect the coolant hoses from the heater matrix pipes at the bulkhead.

31 If not already done, disconnect the wiring plug from the air flap motor on the heater unit.



9.29 Unclip the air ducting from the top of the heater unit



9.32c Withdraw the heater assembly ...



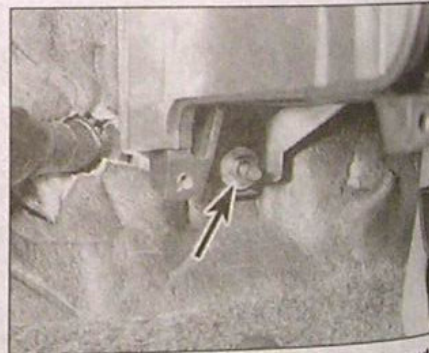
9.27 Unscrewing an engine management electronic control unit securing bolt

32 Working inside the vehicle, unscrew the two lower nuts, and the upper bolt, securing the heater assembly to the bulkhead. Manipulate the assembly past the facia cross-tube, passing the heater matrix pipes through the bulkhead as the assembly is removed (see illustrations).

Refitting

33 To refit the assembly, reverse the steps described for removal, bearing in mind the following points:

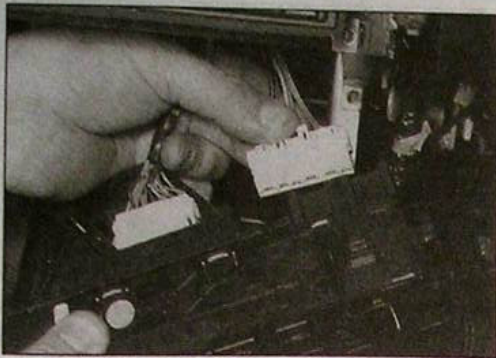
- Make sure that all wiring and cables are routed as noted during dismantling.
- Make sure that all air ducts are securely reconnected.
- Refit the facia components with reference to Chapter 11A.
- On completion, refill and bleed the cooling system as described in Chapter 1.



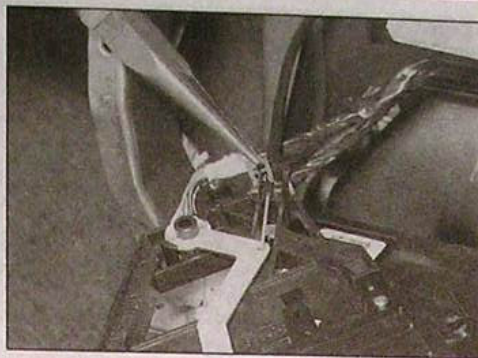
9.32a Heater assembly lower securing nut (arrowed)



9.32d ... and pass the heater matrix pipes (arrowed) through the bulkhead



9.3 Disconnecting a heater/ventilation control unit wiring plug



9.4a Pull out the securing clip . . .



9.4b . . . then disconnect the control cable from the rear of the unit

are contained in the air distribution housing, which acts as a central distribution unit, passing air to the various ducts and vents.

3 Cold air enters the system through the grille at the rear of the engine compartment. If required, the airflow is boosted by the blower fan, and then flows through the various ducts, according to the settings of the controls. Stale air is expelled through ducts at the rear of the vehicle. If warm air is required, the cold air is passed over the heater matrix, which is heated by the engine coolant.

4 On models fitted with air conditioning, a recirculation switch enables the outside air supply to be closed off, while the air inside the vehicle is recirculated. This can be useful to prevent unpleasant odours entering from outside the vehicle, but should only be used briefly, as the recirculated air inside the vehicle will soon become stale.

9 Heater/ventilation components (Phase I and Phase II models) - removal and refitting



Heater/ventilation control unit

Removal

1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

2 Remove the facia lower centre panel, as described in Chapter 11A.

3 Withdraw the control unit forwards from the facia, and disconnect the wiring plugs from the rear of the unit (see illustration).



9.10 Removing the passenger's side lower facia panel

4 Pull out the securing clip, and disconnect the temperature control cable from the lever on the rear of the unit, then withdraw the unit (see illustrations).

Refitting

5 Refitting is a reversal of removal, but reconnect the temperature control cable as follows:

- Move the temperature control lever on the control unit to the fully hot position.
- Move the air mix door lever on the heater unit to the fully hot position.
- Reconnect the end of the cable to the lever on the heater unit, then push the securing clip over the cable.

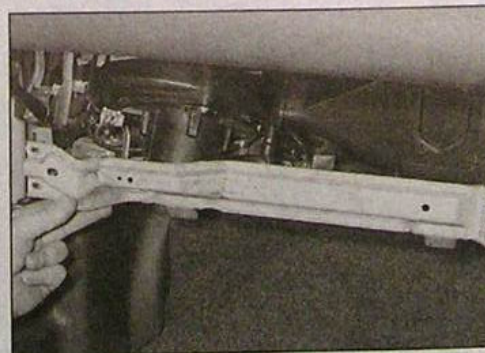
Temperature control cable

6 Removal of the control cable is described previously in this Section as part of the heater/ventilation control unit removal and refitting procedure.

Complete heater assembly

Warning: On models fitted with air conditioning, do not attempt to remove the cooling unit, which is located between the heater blower motor casing and the main heater assembly. Removal of the cooling unit entails disconnection of refrigerant lines - refer to Section 10 for precautions to be observed. If in any doubt as to the procedure to follow on models with air conditioning, consult a Nissan dealer for advice.

Note: This is an involved procedure, and it is recommended that the following Section is



9.11 Removing the metal reinforcing bracket

read thoroughly before commencing work. Plenty of time should be allowed to complete the operation. During dismantling, make notes on the routing of all wiring and cables, and the locations of all fixings, to aid reassembly.

Removal

7 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

8 Drain the cooling system as described in Chapter 1.

9 Working inside the vehicle, under the glovebox, remove the two securing screws (one on each side of the glovebox), then lower the glovebox from the facia.

10 Remove the three securing screws, and withdraw the passenger's side lower facia panel from the facia (see illustration).

11 Remove the securing screws, and withdraw the metal reinforcing bracket which fits across the glovebox aperture (see illustration).

12 Open the passenger's door (if not already done), and pull the weatherstrip and the sill trim panel from the edge of the footwell trim panel.

13 Remove the upper securing nut and the lower screw, then pull the footwell trim panel from the footwell to release the securing clip (see illustration).

14 Disconnect the wiring connector from the now-exposed ABS electronic control unit.

15 Pull back the carpet trim panel to expose the ABS control unit bracket.

16 Unscrew the two securing screws, and withdraw the ABS control unit, complete with the bracket (see Chapter 9).



9.13 Remove the upper securing nut (arrowed) and the screw from the footwell trim panel



6.13 Engine temperature sensor (arrowed) - 1.6 litre fuel injection engine

system has not been drained, plug the sensor aperture to prevent further coolant loss.

Refitting

8 If the sensor was originally fitted using sealing compound, clean the sensor threads thoroughly, and coat them with fresh sealing compound.

9 If the sensor was originally fitted using a sealing ring, use a new sealing ring on refitting.

10 Refitting is a reversal of removal, but refill (or top-up) the cooling system as described in Chapter 1.

11 On completion, start the engine and run it until it reaches normal operating temperature. Continue to run the engine until the cooling fan cuts in and out correctly.

Engine temperature sensor

General

12 The engine temperature sensor provides information to the engine management electronic control unit to control the fuel and ignition systems, and the radiator cooling fan (except on 1.6 litre carburettor engines).

Testing

13 On all models, the sensor is located in the inlet manifold, at the rear (timing chain end) of the cylinder head (see illustration).

14 The sensor contains a thermistor - an electronic component whose electrical resistance decreases at a predetermined rate as its temperature rises.

15 The fuel injection/engine management

ECU supplies the sensor with a set voltage and then, by measuring the current flowing in the sensor circuit, it determines the engine temperature. This information is then used, in conjunction with other inputs, to control the fuel injection/engine management system, and the engine cooling fan.

16 If the sensor circuit should fail to provide adequate information, the ECU back-up facility will override the sensor signal. In this event, the ECU assumes a predetermined setting which will allow the fuel injection/engine management system to run, albeit at reduced efficiency. When this occurs, the engine warning light on the instrument panel will come on, and the advice of a Nissan dealer should be sought. The sensor itself can be tested by removing it, and checking the resistances at various temperatures using an ohmmeter (heat the sensor in a container of water, and monitor the temperature with a thermometer). The resistance values are given in the Specifications. Do not attempt to test the circuit with the sensor fitted to the engine, and the wiring connector fitted, as there is a high risk of damaging the ECU.

17 Refer to the relevant Part of Chapter 4 for further details of the fuel injection/engine management system.

Removal and refitting

18 Proceed as described previously for the cooling fan switch on 1.6 litre carburettor engines.

Coolant temperature gauge sender

Testing

19 On 1.6 litre engines, the sender is located in the rear of the cylinder head, at the flywheel end of the engine. On 2.0 litre engines, the sender is located in the inlet manifold, at the rear (timing chain end) of the cylinder head (see illustrations). The sender is the smaller of the two (where applicable).

20 The temperature gauge is fed with a stabilised voltage from the instrument panel feed (via the ignition switch and a fuse). The gauge earth is controlled by the sender. The sender contains a thermistor - an electronic

component whose electrical resistance decreases at a predetermined rate as its temperature rises. When the coolant is cold, the sender resistance is high, current flow through the gauge is reduced, and the gauge needle points towards the blue (cold) end of the scale. As the coolant temperature rises and the sender resistance falls, current flow increases, and the gauge needle moves towards the upper end of the scale. If the sender is faulty, it must be renewed.

21 If the gauge develops a fault, first check the other instruments; if they do not work at all, check the instrument panel electrical feed. If the readings are erratic, there may be a fault in the voltage stabiliser, which will necessitate renewal of the stabiliser (the stabiliser is integral with the instrument panel printed circuit board - see Chapter 12). If the fault lies in the temperature gauge alone, check it as follows.

22 If the gauge needle remains at the cold end of the scale when the engine is hot, disconnect the sender wiring plug, and earth the relevant wire to the cylinder head. If the needle then deflects when the ignition is switched on, the sender unit is proved faulty, and should be renewed. If the needle still does not move, remove the instrument panel (Chapter 12) and check the continuity of the wire between the sender unit and the gauge, and the feed to the gauge unit. If continuity is shown, and the fault still exists, then the gauge is faulty, and the gauge should be renewed.

23 If the gauge needle remains at the hot end of the scale when the engine is cold, disconnect the sender wire. If the needle then returns to the cold end of the scale when the ignition is switched on, the sender unit is proved faulty, and should be renewed. If the needle still does not move, check the remainder of the circuit as described previously.

Removal and refitting

24 The procedure is similar to that described previously in this Section for the engine temperature sensor. On some models, access to the switch is poor, and other components may need to be removed (or hoses, wiring, etc moved to one side) before the sender unit can be reached.

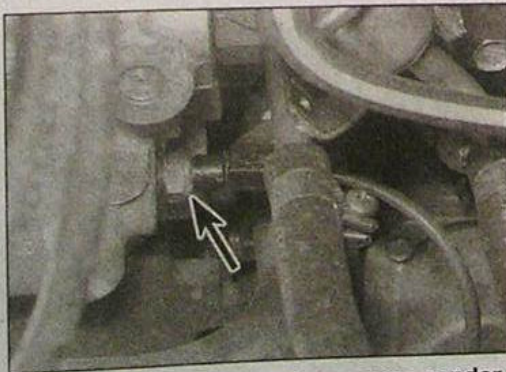
Air conditioning system temperature sensor

Testing

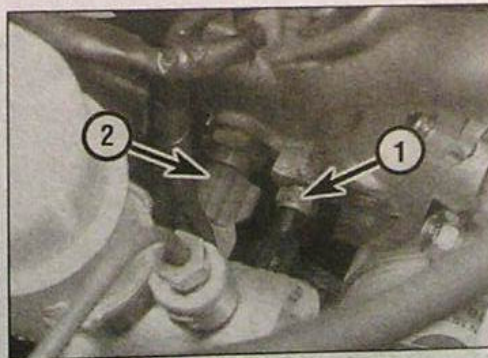
25 The sensor is integral with the air conditioning temperature control unit, located on the side of the heater/air conditioning unit behind the fascia. Testing should be entrusted to a Nissan dealer.

Removal and refitting

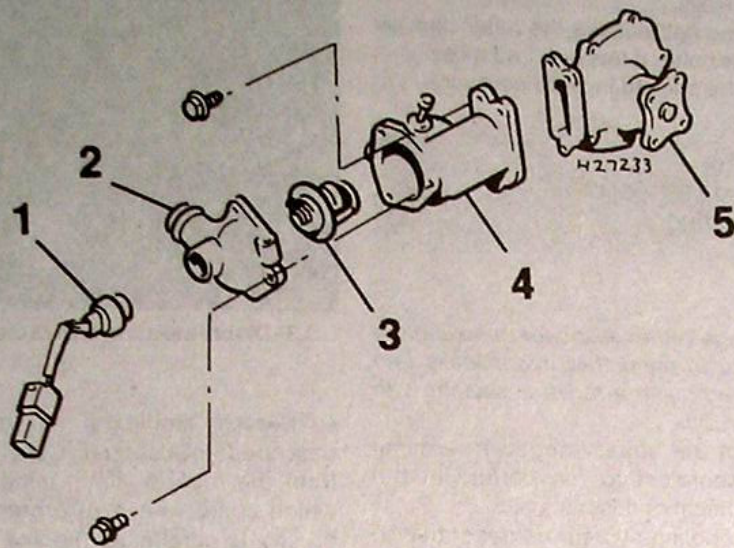
26 Removal and refitting should be entrusted to a Nissan dealer suitably equipped to test the unit.



6.19a Coolant temperature gauge sender (arrowed) - 1.6 litre fuel injection engine

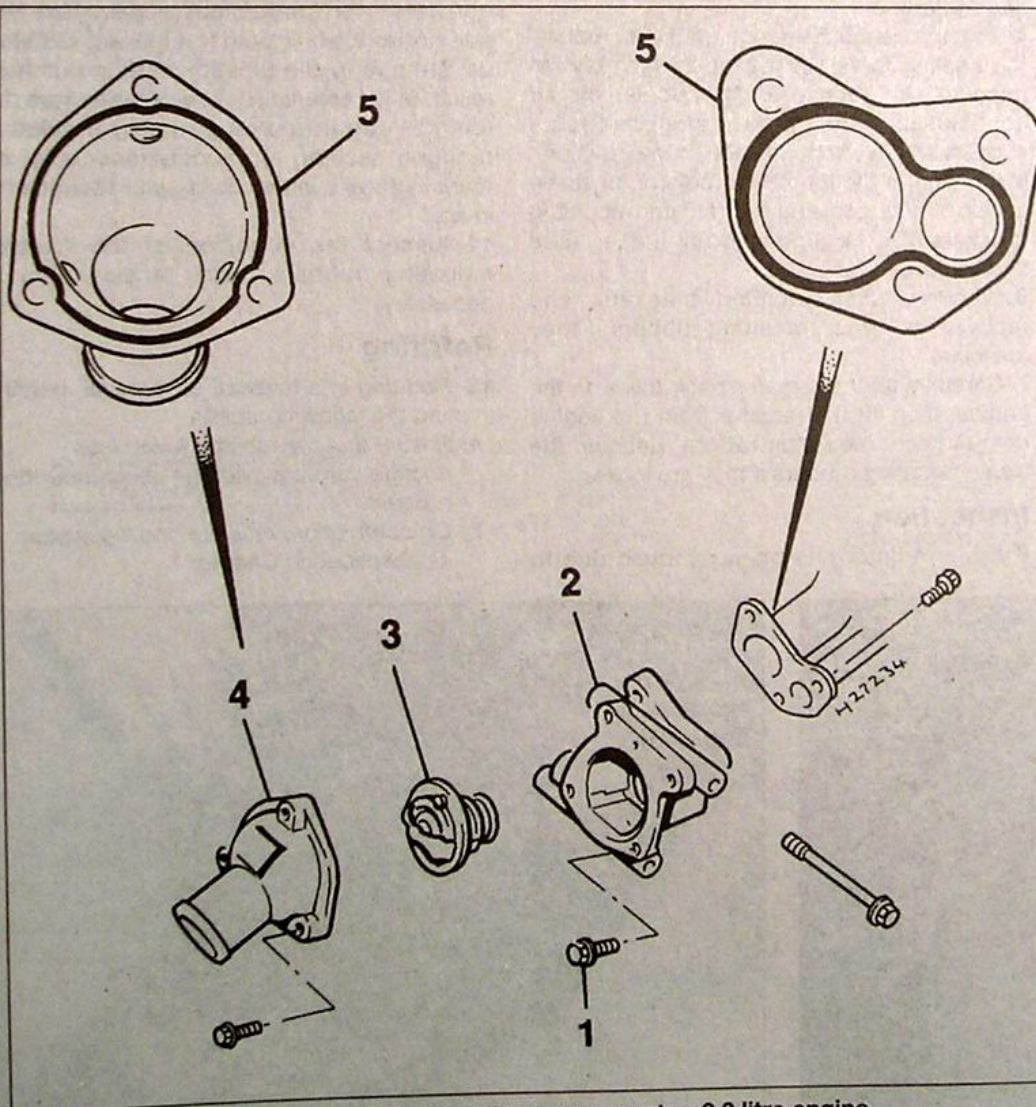


6.19b Coolant temperature gauge sender (1) and engine temperature sensor (2) - 2.0 litre engine



4.1 Thermostat housing and coolant pump components - 1.6 litre engine

- | | | |
|----------------------|----------------------|----------------|
| 1 Cooling fan switch | 3 Thermostat | 5 Coolant pump |
| 2 Thermostat cover | 4 Thermostat housing | |



4.2 Thermostat and housing components - 2.0 litre engine

- | | | |
|----------------------|--------------------|---------------------------|
| 1 Air bleed screw | 3 Thermostat | 5 Sealant (liquid gasket) |
| 2 Thermostat housing | 4 Thermostat cover | |

4 Thermostat - removal, testing and refitting

Removal

Note: Suitable sealant (liquid gasket) will be required when refitting the thermostat housing.

1 On 1.6 litre engines, the thermostat is located in a housing bolted to the side of the coolant pump, at the timing chain end of the engine (see illustration).

2 On 2.0 litre engines, the thermostat is located in a housing bolted to the transmission end of the cylinder head (see illustration).

3 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

4 Drain the cooling system as described in Chapter 1.

5 Disconnect the coolant hose from the thermostat cover (see illustration).

6 On 1.6 litre engines, disconnect the wiring plug from the cooling fan switch located in the thermostat cover.

7 Where applicable, release the wiring harness from the clip on the thermostat cover, and move it to one side.

8 Unscrew the securing bolts, and remove the thermostat cover from the housing. If the cover is stuck to the housing, tap it gently, or rock it back and forth to free it - do not lever between the mating faces.

9 Lift the thermostat from the housing, noting that the bleed valve is located at the top.

Testing

10 A rough test of the thermostat may be made by suspending it with a piece of string in a container full of water. Heat the water to bring it to the boil - the thermostat must open by the time the water boils. If not, renew it.

11 If a thermometer is available, the precise opening temperature of the thermostat may be determined; compare with the figures given in the Specifications. The opening temperature is also marked on the thermostat.

12 A thermostat which fails to close as the water cools must also be renewed.



4.5 Disconnecting the coolant hose from the thermostat housing

1 General information and precautions

General information

The cooling system is of pressurised type, comprising a coolant pump driven by a V-belt from the crankshaft pulley, a crossflow radiator, a coolant expansion tank, an electric cooling fan, a thermostat, heater matrix, and all associated hoses and switches (see illustration).

The system functions as follows. The coolant pump pumps cold water around the cylinder block and head passages, and through the inlet manifold, heater and carburettor/throttle body to the thermostat housing.

When the engine is cold, the coolant is returned from the thermostat housing to the coolant pump. When the coolant reaches a predetermined temperature, the thermostat opens, and the coolant passes through the top hose to the radiator. As the coolant circulates through the radiator, it is cooled by the inrush of air when the car is in forward motion. The airflow is supplemented by the action of the electric cooling fan when necessary. Upon reaching the bottom of the radiator, the coolant has now cooled, and the cycle is repeated.

When the engine is at normal operating

temperature, the coolant expands, and some of it is released through the valve in the radiator pressure cap into the expansion tank. Coolant collects in the tank, and is returned to the radiator when the system cools.

On some models, the coolant is also passed through the engine oil cooler.

The electric cooling fan(s) mounted in front of the radiator are controlled by a thermostatic switch. At a predetermined coolant temperature, the switch/sensor actuates the fan.

Note: In certain Sections of this Chapter references are made to Phase I, Phase II and Phase III models according to year of production. This classification has been necessary where modifications to the model range affect the repair procedure being described. The Phases relate to the model years as follows:

Phase I - 1990 to June 1993

Phase II - June 1993 to October 1996

Phase III - October 1996 to September 1999

Precautions

Warning: Do not attempt to remove the radiator pressure cap, or to disturb any part of the cooling system, while the engine is hot, as there is a high risk of scalding. If the radiator pressure cap must be removed before the engine and radiator have fully cooled (even though this is not

recommended), the pressure in the cooling system must first be relieved. Cover the cap with a thick layer of cloth, to avoid scalding, and slowly unscrew the pressure cap until a hissing sound is heard. When the hissing has stopped, indicating that the pressure has reduced, slowly unscrew the pressure cap until it can be removed; if more hissing sounds are heard, wait until they have stopped before unscrewing the cap completely. At all times, keep your face well away from the pressure cap opening, and protect your hands.



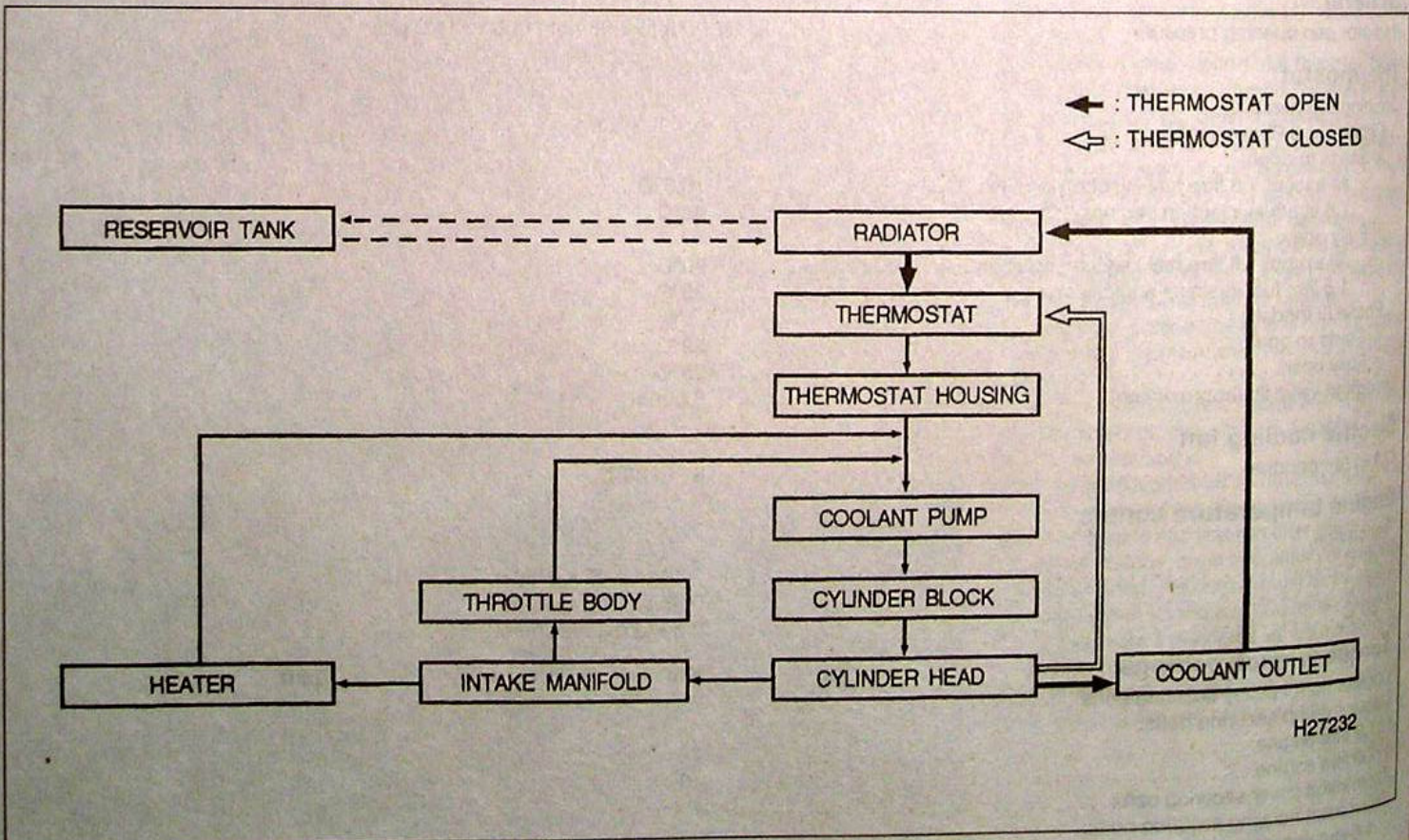
Warning: Do not allow antifreeze to come into contact with your skin, or with the painted surfaces of the vehicle. Rinse off spills immediately, with plenty of water. Never leave antifreeze lying around in an open container, or in a puddle in the driveway or on the garage floor. Children and pets are attracted by its sweet smell, but antifreeze can be fatal if ingested.



Warning: If the engine is hot, the electric cooling fan may start rotating even if the engine is not running. Be careful to keep your hands, hair, and any loose clothing well clear when working in the engine compartment.



Warning: Refer to Section 11 for precautions to be observed when working on models equipped with air conditioning.



H27232

1.1 Typical cooling system layout - 2.0 litre engine shown, 1.6 litre engine similar