

Chapter 3

Cooling, heating and air conditioning 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



Specifications

General

Maximum system pressure	1.4 bars
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Thermostat

Opening temperatures:

All except 2.5 litre diesel engines:

Starts to open	85°C
Fully open	100°C

2.5 litre diesel engines:

Main thermostat:

Starts to open	85°C
Fully open	100°C

Secondary thermostat:

Starts to open	84°C
Fully open	88°C

1 General information and precautions

General information

The cooling system is of pressurised type, comprising a pump driven by the timing belt (all except 2.5 litre diesel engines), or the auxiliary drivebelt (2.5 litre diesel engines), an aluminium crossflow radiator, electric cooling fan, and a thermostat. The system functions as follows. Cold coolant from the radiator passes through the hose to the coolant pump, where it is pumped around the cylinder block

and head passages. After cooling the cylinder bores, combustion surfaces and valve seats, the coolant reaches the underside of the thermostat, which is initially closed. The coolant passes through the heater, and is returned via the cylinder block to the coolant pump.

When the engine is cold, the coolant circulates only through the cylinder block, cylinder head and heater. When the coolant reaches a predetermined temperature, the thermostat opens and the coolant passes through 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. Airflow is supplemented by the action

of the electric cooling fan when necessary. Once the coolant has passed through the radiator, and has cooled, the cycle is repeated.

The electric cooling fan, mounted on the rear of the radiator, is controlled by a thermostatic switch. At a predetermined coolant temperature, the switch actuates the fan. On models with air conditioning, the cooling fans are controlled via the air conditioning and engine management ECUs.

An expansion tank is fitted to allow for the expansion of the coolant when hot. The expansion tank is connected to the top of the radiator.

Refer to Section 10 for information on the air conditioning system.

Precautions



Warning: Do not attempt to remove the expansion tank filler cap, or disturb any part of the cooling system, while the engine is hot; there is a high risk of scalding. If the expansion tank filler 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 filler cap until a hissing sound can be heard. When the hissing has stopped, indicating that the pressure has reduced, slowly unscrew the filler 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 well away from the filler cap opening.



Warning: Do not allow antifreeze to come into contact with 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 on the driveway or 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 hands, hair and loose clothing well clear when working in the engine compartment.

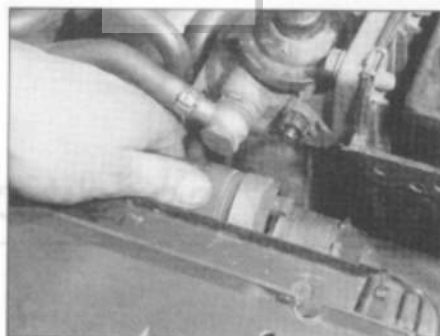


Warning: Refer to Section 10 for precautions to be observed when working on models equipped with air conditioning.

2 Cooling system hoses – disconnection and renewal



Note: Refer to the warnings given in Section 1 of this Chapter before proceeding. Do not



2.3 Disconnecting the radiator top hose

attempt to disconnect any hose while the system is still hot.

- 1 If the checks described in Chapter 1 reveal a faulty hose, it must be renewed as follows.
- 2 First drain the cooling system (see Chapter 1). If the coolant is not due for renewal, it may be re-used if it is collected in a clean container.
- 3 Before disconnecting a hose, first note its routing in the engine compartment, and whether it is secured by any clips or ties. Use a screwdriver to slacken the clips, then move the clips along the hose, clear of the relevant inlet/outlet union. Carefully work the hose free (see illustration).
- 4 Note that the radiator inlet and outlet unions are fragile; do not use excessive force when attempting to remove the hoses. If a hose proves to be difficult to remove, try to release it by rotating the hose ends before attempting to free it.



If all else fails, cut the coolant hose with a sharp knife, then slit it so that it can be peeled off in two pieces. Although this may prove expensive if the hose is otherwise undamaged, it is preferable to buying a new radiator.

- 5 When fitting a hose, first slide the clips onto the hose, then work the hose into position. If clamp-type clips were originally fitted, it is a good idea to replace them with screw-type

clips when refitting the hose. If the hose is stiff, use a little soapy water (washing-up liquid is ideal) as a lubricant, or soften the hose by soaking it in hot water.

- 6 Work the hose into position, checking that it is correctly routed and secured. Slide each clip along the hose until it passes over the flared end of the relevant inlet/outlet union, before tightening the clips securely.
- 7 Refill the cooling system with reference to Chapter 1.
- 8 Check thoroughly for leaks as soon as possible after disturbing any part of the cooling system.

3 Radiator – removal, inspection and refitting



Removal

- 1 Using a screwdriver, release the securing clip, and remove the cover from the battery, then disconnect the battery negative lead.
- 2 Drain the cooling system as described in Chapter 1. Where applicable, disconnect the fan switch wiring.
- 3 The radiator is removed by lifting it out of the engine compartment but, on some models, there is insufficient clearance for the radiator to pass between the front body panel and the engine, in which case, proceed as follows (see illustrations).
- a) Remove the sidelight units as described in Chapter 13.
- b) Unscrew the front grille panel securing bolts (one on each side) from the sidelight apertures.
- c) Unscrew the four upper front body panel securing bolts.
- d) Working under the front wheel arches, prise the covers from the wheel arch liners for access to the front bumper side securing bolts (one on each side of the vehicle), then unscrew the securing bolts.
- 4 Slacken the hose clips, and disconnect the upper and lower radiator hoses. Where applicable, release the hose clips, and disconnect the remaining coolant hoses from the top of the radiator (see illustrations).



3.3a Unscrew the front grille panel securing bolts (arrowed) from the sidelight apertures ...



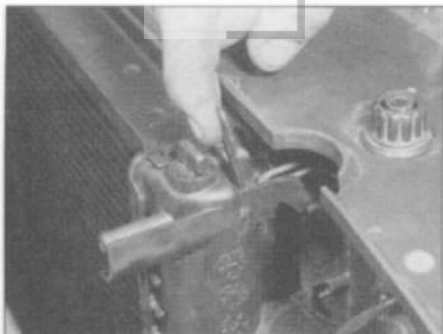
3.3b ... and unscrew the upper front body panel securing bolts



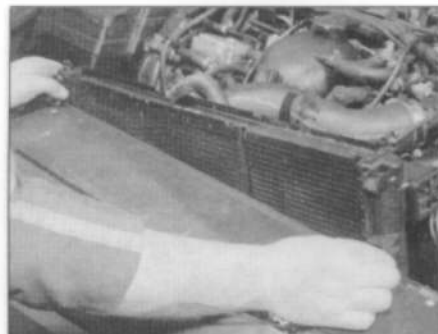
3.4a Disconnecting the lower radiator hose



3.4b Disconnecting the smaller hose from the top of the radiator – 2.5 litre diesel engine model



3.5 Depressing a radiator securing clip – 2.5 litre diesel engine model



3.8 Lifting out the radiator

5 Working at the top corners of the radiator, depress the two radiator securing clips then, where applicable, tilt the radiator back to allow access to the two coolant hoses connected to the lower right-hand corner of the radiator (see illustration).

6 On the 2.5 litre diesel engine, unbolt the fuel filter housing from the battery tray, and move it to one side, leaving the hoses connected.

7 If there is insufficient clearance for the radiator to pass between the front body panel and the engine, carefully pull the body panel forwards (the securing bolts should have been removed – see paragraph 3) to give sufficient clearance to remove the radiator. Take care not to damage the body panel or surrounding components, as not all the securing bolts have been removed.

8 Carefully lift the radiator from the engine compartment, taking care not to damage the radiator fins on surrounding components (see illustration).

Inspection

9 If the radiator has been removed due to 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.

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

11 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.

12 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*.

13 If the radiator is to be sent for repair or renewed, remove all hoses.

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

Refitting

15 Refitting is a reversal of removal, bearing in mind the following points.

- If there is limited clearance for the radiator to pass between the body front panel and the engine, it may prove helpful to hold the radiator securing clips in the released position, using cable-ties or string, until the radiator has been refitted.
- Ensure that the lower radiator locating pins engage correctly with the mounting rubbers.
- On completion, refill the cooling system as described in Chapter 1.

4 Thermostat – removal, testing and refitting

Petrol engines

Note: A new thermostat sealing ring should be used on refitting.

Removal

1 On petrol engines, the thermostat is located at the left-hand end of the cylinder head.

2 Using a screwdriver, release the securing clip, and remove the cover from the battery, then disconnect the battery negative lead.



4.6 Unscrew the thermostat cover bolts ...

3 Drain the cooling system as described in Chapter 1A.

4 Where necessary, release any relevant hoses and wiring from the retaining clips and/or brackets, and move them clear of the thermostat housing to improve access.

5 If necessary, slacken the clip(s) and disconnect the coolant hose(s) from the thermostat cover. Note that this is not necessary on all models, as the thermostat cover can usually be moved sufficiently to remove the thermostat without disconnecting the hose(s).

6 Unscrew the securing nuts or bolts (as applicable), and carefully lift off the thermostat cover to expose the thermostat (see illustration).

7 Lift the thermostat from the housing, and recover the sealing ring (see illustration).

Testing

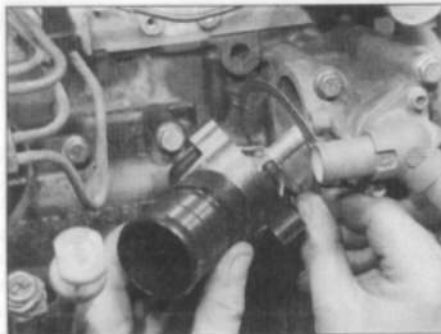
8 A rough test of the thermostat's operation may be made by suspending it with a piece of string in a container full of water. Heat the water to bring it to the boil – the thermostat must open by the time the water boils. If not, renew it.

9 The opening temperature is usually marked on the thermostat. If a thermometer is available, the precise opening temperature of the thermostat may be determined, and compared with the value marked on the thermostat.

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



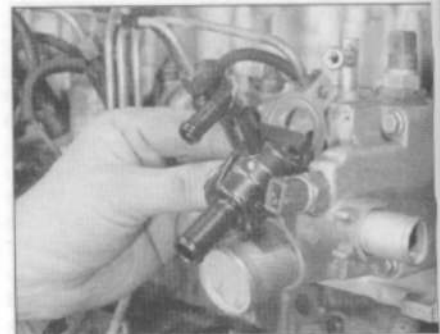
4.7 ... and lift out the thermostat and sealing ring – petrol engine



4.24 Removing the main thermostat cover/thermostat and gasket – 2.5 litre diesel engine (viewed with engine removed for clarity)



4.27 Tightening the main thermostat cover/thermostat securing bolts – 2.5 litre diesel engine (viewed with engine removed for clarity)



4.32 Removing the auxiliary thermostat cover/thermostat assembly – 2.5 litre diesel engine (viewed with engine removed for clarity)

Refitting

11 Refitting is a reversal of removal, bearing in mind the following points.

- Always fit a new sealing ring, and ensure that the thermostat is fitted the correct way round, with the spring(s) facing into the housing.*
- On completion, refill the cooling system as described in Chapter 1A.*

2.1 litre diesel engine

Note: A new thermostat sealing ring should be used on refitting.

Removal

- The thermostat is located at the rear right-hand corner of the cylinder block.
- Using a screwdriver, release the securing clip, and remove the cover from the battery, then disconnect the battery negative lead.
- If desired, to improve access, apply the parking brake, then jack up the front of the vehicle and support securely on axle stands (see *Jacking and Vehicle Support*).
- Drain the cooling system as described in Chapter 1B.
- Proceed as described in paragraphs 4 to 7.

Testing

- Proceed as described in paragraphs 8 to 10.

Refitting

18 Refitting is a reversal of removal, bearing in mind the following points.

- Always fit a new sealing ring, and ensure that the thermostat is fitted the correct way round, with the spring(s) facing into the housing on non-turbo models, or into the cover on turbo models.*
- On completion, refill the cooling system as described in Chapter 1B.*

2.5 litre diesel engine – main thermostat

Note: A new thermostat cover gasket will be required on refitting.

Removal

- The thermostat is located in the rear of the coolant pump housing, at the left-hand end of

the cylinder block. The thermostat is integral with the cover, and the two components are not available separately.

20 To enable access to the thermostat, unbolt the coolant reservoir, and move it to one side, leaving the hoses connected.

21 Drain the cooling system as described in Chapter 1B.

22 Slacken the clip, and disconnect the coolant hose from the thermostat cover.

23 Unscrew the securing bolts, and remove the thermostat cover/thermostat assembly.

24 Recover the gasket (see illustration).

Testing

- Proceed as described in paragraphs 8 to 10.

Refitting

26 Thoroughly clean the mating faces of the thermostat cover and the housing.

27 Refit the thermostat cover/thermostat assembly using a new gasket, and tighten the securing bolts (see illustration).

28 Further refitting is a reversal of removal, but on completion, refill the cooling system as described in Chapter 1B.

2.5 litre diesel engine – auxiliary thermostat

Removal

29 The auxiliary thermostat is located at the top of the coolant housing, at the front left-hand corner of the cylinder head. The thermostat is integral with the cover, and the two components are not available separately.

30 Drain the cooling system as described in Chapter 1B.

31 Slacken the clips, and disconnect the coolant hoses from the thermostat cover.

32 Unscrew the securing bolts, and remove the thermostat cover/thermostat assembly (see illustration).

33 Recover the gasket.

Testing

- Proceed as described in paragraphs 8 to 10.

Refitting

- Proceed as described in paragraphs 26 to 28.

5 Electric cooling fan – testing, removal and refitting

Testing

1 Current supply to the cooling fan(s) is via the ignition switch (see Chapter 5A) and a fuse (see Chapter 13). The circuit is completed by the cooling fan thermostatic switch. On models with air conditioning, the cooling fans are controlled via the air conditioning and engine management ECUs, and testing should be entrusted to a Citroën dealer or specialist.

2 If a 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, or before the coolant temperature warning light comes on). If not, switch off the ignition and disconnect the wiring plug from the cooling fan switch. Bridge the two contacts in the wiring plug using a length of spare wire, and switch on the ignition. If the fan now operates, the switch is probably faulty, and should be renewed.

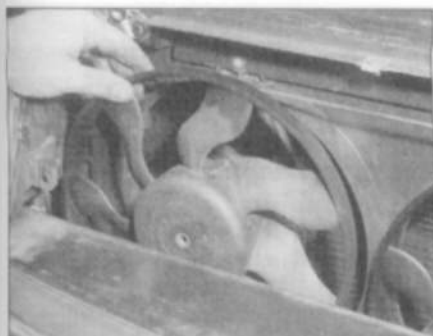
3 If the fan still fails to operate, check that battery voltage is available at the feed wire to the switch; if not, then there is a fault in the feed wire (possibly due to a fault in the fan motor, or a blown fuse). If there is no problem with the feed, check that there is continuity between the switch earth terminal and a good earth point on the body; if not, then the earth connection is faulty, and must be re-made.

4 If the switch and the wiring are in good condition, the fault must lie in the motor itself. The motor can be checked by disconnecting it from the wiring loom, and connecting a 12-volt supply directly to it.

Removal

5 Using a screwdriver, release the securing clip, and remove the cover from the battery, then disconnect the battery negative lead.

6 Remove the front grille panel as described in Chapter 12.



5.7 Removing the cooling fan blades



5.8a Unscrew the securing bolts ...



5.8b ... and withdraw the fan motor

7 Remove the securing screw and withdraw the cooling fan blades (see illustration).

8 Unscrew the three securing bolts, and withdraw the fan motor from the housing (see illustrations).

Refitting

9 Refitting is a reversal of removal, bearing in mind the following points.

- Ensure that the motor is fitted correct way round so that wiring plug engages with the connector.
- Make sure fan blades engage with flat on motor shaft.

compound, clean the switch threads thoroughly.

8 Where applicable, coat the switch threads with fresh sealing compound.

9 Refitting is a reversal of removal. Tighten the switch, and refill (or top-up) the cooling system as described in Chapter 1 or *Weekly checks*, as applicable.

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

Cooling fan switch – 2.1 litre diesel engine

11 The switch is located in the coolant housing at the front left-hand corner of the cylinder head. Note that on models with air conditioning, the cooling fans are controlled via the air conditioning and engine management ECUs.

Testing

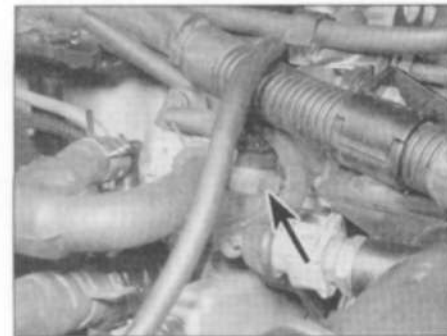
12 Testing of the switch is described in Section 5 as part of the electric cooling fan test procedure.

Removal and refitting

13 Proceed as described in paragraphs 3 to 10.

Cooling fan switch – 2.5 litre diesel engine

14 The sensor is located in the auxiliary thermostat housing, at the left-hand end of the engine (see illustration). Note that on models with air conditioning, the cooling fans



6.14 Cooling fan switch location (arrowed) – 2.5 litre diesel engine model

6 Cooling system electrical switches and sensors – testing, removal and refitting

Cooling fan switch – petrol engine

1 The switch is located at the right-hand end of the radiator. Note that on models with air conditioning, the cooling fans are controlled via the air conditioning and engine management ECUs.

Testing

2 Testing of the switch is described in Section 5 as part of the electric cooling fan test procedure.

Removal

- Disconnect the battery negative lead.
- Partially drain the cooling system to just below the level of the switch (see Chapter 1). Alternatively, have ready a suitable bung to plug the switch aperture in the radiator when the switch is removed. If this method is used, take great care not to damage the threads in the radiator, and do not use anything which will allow foreign matter to enter the cooling system.
- Disconnect the wiring plug from the switch.
- Carefully unscrew the switch from the radiator. If the system has not been drained, plug the switch aperture to prevent further coolant loss.

Refitting

7 If the original switch is being refitted, and the switch was originally fitted using sealing

are controlled via the air conditioning and engine management ECUs.

Testing

15 Testing of the switch is described in Section 5 as part of the electric cooling fan test procedure.

Removal and refitting

16 Proceed as described in paragraphs 3 to 10.

Coolant temperature sensor – petrol engine

17 The sensor is located in the thermostat housing at the left-hand end of the cylinder head.

Testing

18 The sensor contains a thermistor – an electronic component whose electrical resistance decreases at a predetermined rate as its temperature rises. The 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 injector opening time (pulse width). On some models, the idle speed and/or the ignition timing settings are also temperature-dependent.

19 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 engine management system to run, albeit at reduced efficiency. When this occurs, the warning light on the instrument panel will come on, and the advice of a Citroën dealer should be sought. The sensor circuit can be tested using suitable diagnostic equipment. Do not attempt to test the circuit using any other equipment, as there is a risk of damaging the ECU.

Removal and refitting

20 The procedure is similar to that described previously in this Section for the cooling fan switch.

Coolant temperature sensor – 2.1 litre diesel engine

Testing

21 The sensor is located in the coolant housing at the front left-hand corner of the



6.23 Coolant temperature sensor location (arrowed) - 2.5 litre diesel engine

cylinder head. The sensor contains a thermistor (see paragraph 18), which provides a signal to control the exhaust gas recirculation system.

Removal and refitting

22 The procedure is similar to that described previously in paragraphs 3 to 10 for the cooling fan switch.

Coolant temperature sensor - 2.5 litre diesel engine

Testing

23 The sensor is located in the thermostat housing, at the left-hand end of the engine (see illustration). The sensor contains a thermistor (see paragraph 18), which provides a signal to the engine management ECU.

Removal and refitting

24 The procedure is similar to that described previously in paragraphs 3 to 10 for the cooling fan switch.

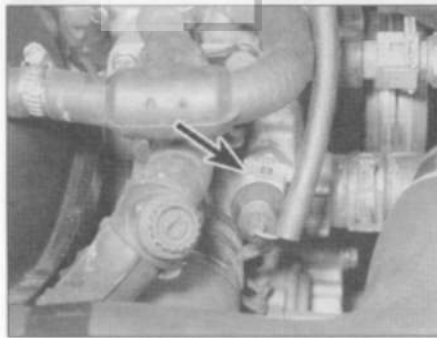
Temperature gauge sender - petrol engine

Testing

25 The sensor is located in the thermostat housing at the left-hand end of the cylinder head.

26 The temperature gauge is fed with a stabilised voltage from the instrument panel feed. The gauge earth is controlled by the sender. The sender contains a thermistor (see paragraph 18). 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.

27 On models with a temperature warning light, the light is fed with a voltage from the instrument panel. The light earth is controlled by the sender. The sender is effectively a switch, which operates at a predetermined temperature to earth the light and complete the circuit. The senders for the light and temperature gauge are incorporated in a single unit with two wires, one each for gauge and light earths.



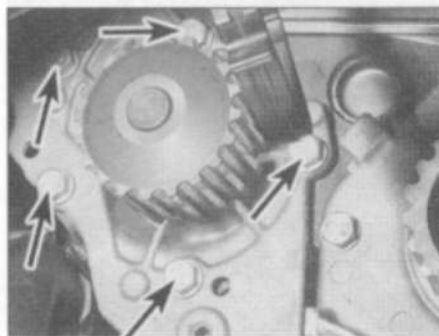
6.35 Temperature gauge sender location (arrowed) - 2.5 litre diesel engine

28 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). If the fault lies in the temperature gauge alone, check it as follows.

29 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, then sender unit is proved faulty, and should be renewed. If the needle still does not move, remove the instrument panel (see Chapter 13) and check the continuity of the wire between the sender and the gauge. Also check the feed to the gauge unit. If continuity is shown, and the fault still exists, the gauge is faulty, and should be renewed.

30 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 proved faulty, and should be renewed. If the needle still does not move, check the remainder of the circuit as described previously.

31 The same basic principles apply to testing the warning light. The light should illuminate when the relevant sender wire is earthed.



7.4a Unscrew the securing bolts (arrowed) ...

Removal and refitting

32 The procedure is similar to that described previously in paragraphs 3 to 10 for the cooling fan switch.

Temperature gauge sender - 2.1 litre diesel engine

Testing

33 The sensor is located in the coolant housing at the front left-hand corner of the cylinder head. The testing procedure is as described for petrol engine models in paragraphs 25 to 31.

Removal and refitting

34 The procedure is similar to that described previously in paragraphs 3 to 10 for the cooling fan switch.

Temperature gauge sender - 2.5 litre diesel engine

Testing

35 The sensor is located in the thermostat housing, at the left-hand end of the engine (see illustration). The testing procedure is as described for petrol engine models in paragraphs 25 to 31.

Removal and refitting

36 The procedure is similar to that described previously in paragraphs 3 to 10 for the cooling fan switch.

7 Coolant pump - removal and refitting

All except 2.5 litre diesel engine

Removal

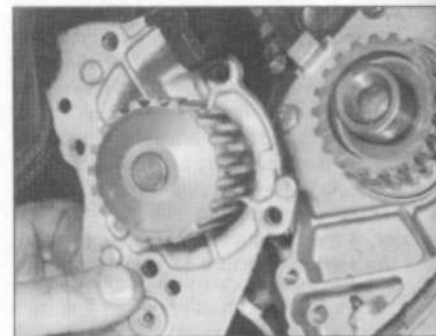
1 The coolant pump is located at the right-hand end of the engine, and is driven by the timing belt.

2 Drain the cooling system as described in Chapter 1.

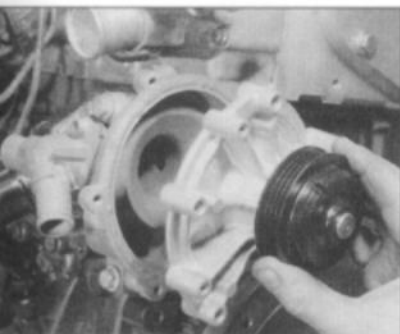
3 Remove the timing belt as described in Chapter 2, Part A.

4 Unscrew the securing bolts, and lift the coolant pump from the engine (see illustrations).

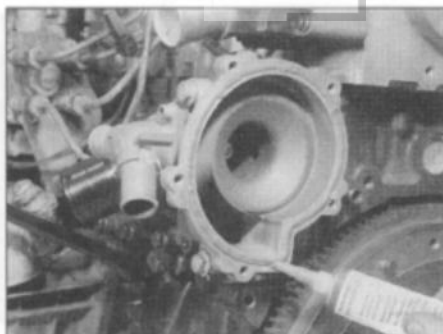
5 Recover the gasket.



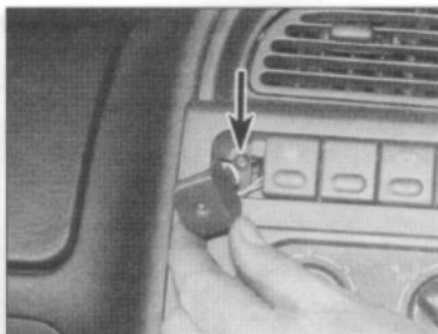
7.4b ... and remove the coolant pump - petrol engine model



2 Removing the coolant pump – 2.5 litre diesel engine (viewed with engine removed for clarity)



7.14 Coat the mating face of the coolant pump housing with sealing compound – 2.5 litre diesel engine (viewed with engine removed for clarity)



9.15 Prise out the alarm bulb trim plate to expose the switch/heater control/display trim panel securing screw (arrowed)

Refitting

Thoroughly clean the mating faces of the coolant pump and cylinder block.

Fit the pump using a new gasket, and tighten the securing bolts securely.

Refit the timing belt as described in Chapter Part A.

Refill the cooling system as described in Chapter 1.

2.5 litre diesel engine

Removal

The coolant pump is located at the left-hand end of the engine, and is driven via an auxiliary drivebelt from a pulley on the crankshaft.

Remove the coolant pump drivebelt as described in Chapter 1B.

Unscrew the securing bolts, and lift the coolant pump from the engine (see illustration).

Refitting

Commence refitting by thoroughly cleaning the mating faces of the coolant pump and its housing.

Coat the mating face of the coolant pump housing with a thin layer of sealing compound (see illustration).

Refit the pump, and tighten the securing bolts securely.

Refit and tension the pump drivebelt as described in Chapter 1B.

Heating and ventilation system – general information

The heater/ventilation system consists of a blower motor (housed behind the fascia), face-level vents in the centre and at each end of the fascia, and air ducts to the front footwells, and the rear passenger compartment (located behind the centre pillars).

The control unit is located in the fascia, and its controls operate flap valves and a coolant pump, to deflect and mix the air flowing through the various parts of the

heater/ventilation system. The flap valves 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.

4 The air (boosted by the blower fan if required) 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 through the heater matrix, which is heated by the engine coolant.

5 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 deteriorate.

6 A manual or automatic control unit may be fitted, depending on model. The automatic control unit provides electronic control of the heater/ventilation system and the air conditioning system (where applicable), and maintains the temperature inside the car at the desired pre-set value.

9 Heater/ventilation system components – removal and refitting

Heater/ventilation control unit – models up to 1994

Removal

1 Using a screwdriver, release the securing clip, and remove the cover from the battery, then disconnect the battery negative lead.

2 Working at each side of the instrument panel in turn, prise out the cover plate, and unscrew the instrument panel surround securing screw.

3 Withdraw the instrument panel surround from the fascia.

4 Carefully pull the knobs from the heater/ventilation controls.

5 Unscrew the two securing screws (located in the blower motor and air temperature control apertures), and remove the heater/ventilation control unit trim panel.

6 Unscrew the four screws securing the heater/ventilation control unit to the fascia.

7 Move the adjuster to fully lower the steering column.

8 Working underneath the fascia, on either side of the steering column, unscrew the two lower switch/heater control/display trim panel securing screws.

9 Working at the front of the instrument panel aperture, unscrew the two upper switch/heater control/display trim panel securing screws.

10 Pull the top of the switch/heater control/display trim panel forwards from the fascia to release the securing clips then, working at the rear of the panel, disconnect the wiring plugs from the panel-mounted components, noting the locations of the plugs, and withdraw the panel.

11 Pull the heater/ventilation control panel forwards from the fascia, and disconnect the wiring plug(s) and, where applicable, the control cables from the rear of the unit, noting their locations.

12 Withdraw the heater/ventilation control panel.

Refitting

13 Refitting is a reversal of removal, but make sure that the control cables and wiring plug(s), as applicable, are correctly reconnected as noted before removal.

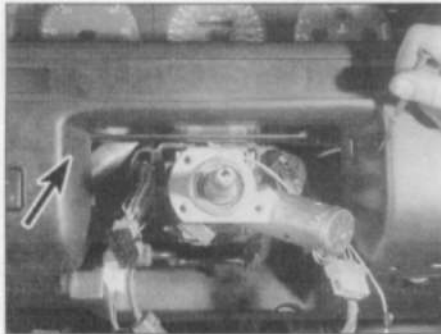
Heater/ventilation control unit – models from 1995

Removal

14 Remove the steering column shrouds as described in Chapter 12.

15 Carefully prise out the alarm bulb trim plate (or the blanking plate, as applicable) from the passenger's side end of the panel, to expose the upper switch/heater control/display trim panel securing screw (see illustration). Remove the screw.

16 Working on either side of the steering



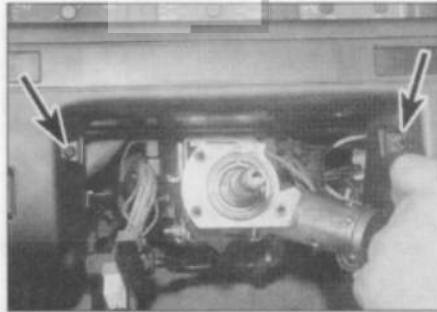
9.16a Prise out the covers ...

column, prise out the screw covers, then remove the remaining two upper switch/heater control/display trim panel securing screws (see illustrations).

17 Using a small flat-bladed screwdriver, carefully prise the heater control surround panel from the switch/heater control/display trim panel, then unscrew the four screws securing the heater control panel to the trim panel (see illustrations).

18 Unscrew the five lower securing screws from the bottom of the switch/heater control/display trim panel.

19 Lever the driver's side of the panel to release the securing clip, then withdraw the panel forward from the fascia (see illustration). Working at the rear of the panel, disconnect the wiring plugs from the panel-mounted



9.16b ... then remove the remaining two upper switch/heater control/display trim panel securing screws (arrowed)

components, noting the locations of the plugs, and withdraw the panel.

20 Proceed as described in paragraphs 11 and 12.

Refitting

21 Refitting is a reversal of removal, but make sure that the control cables and wiring plug(s), as applicable, are correctly reconnected as noted before removal, and refit the steering column shrouds with reference to Chapter 12.

Heater blower motor

Removal

22 Using a screwdriver, release the securing clip, and remove the cover from the battery, then disconnect the battery negative lead.



9.17a Prise out the heater control surround panel ...

23 Working on one side of the centre console, remove the side trim panel as follows.

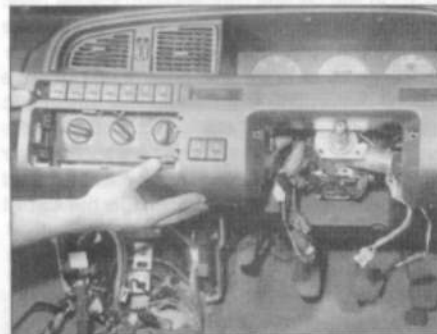
- Unscrew the two screws securing the front air vent, and pull out the air vent.
- Unscrew the screw securing the rear air vent, and withdraw the vent.
- Working through the slit in the carpet trim, unscrew the side trim panel rear securing nut.
- Withdraw the trim panel.

24 Remove the securing screws and clips, and withdraw the passenger's side lower fascia panel (see illustration).

25 Unscrew the three securing screws, then lower the motor assembly from the heater assembly, and disconnect the two wiring connectors (see illustrations).



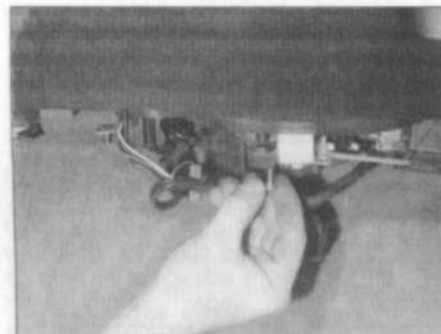
9.17b ... then unscrew the four heater control panel securing screws (arrowed)



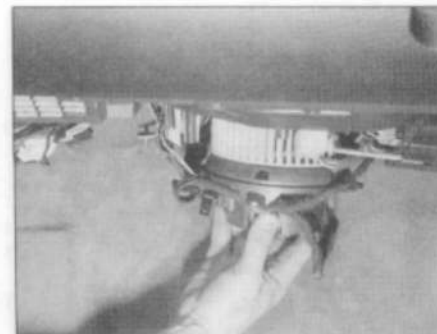
9.19 Withdraw the switch/heater control/display trim panel



9.24 Removing the passenger's side lower fascia panel



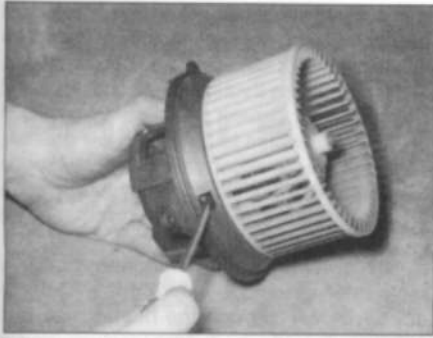
9.25a Remove the securing screws ...



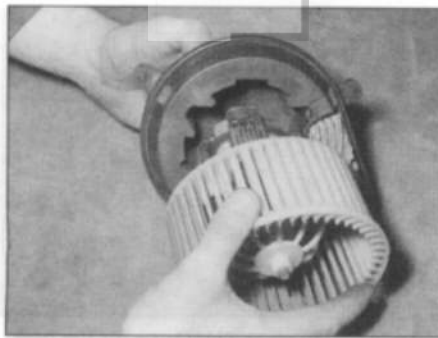
9.25b ... and lower the heater blower motor assembly



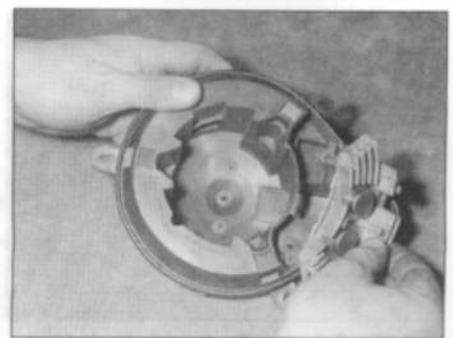
9.26a Pull the motor wiring plug out of the housing ...



9.26b ... then depress the motor retaining rubbers ...



9.26c ... and pull the motor and fan blades assembly from the housing



9.30 Withdrawing the heater blower motor control unit

26 To remove the motor from its housing, proceed as follows (see illustrations).

- Pull the motor wiring plug out of the housing.
- Using a screwdriver inserted through the slots in the housing, depress the three motor retaining rubbers.
- Pull the motor and fan blades assembly from the housing.

Refitting

27 Refitting is a reversal of removal but, if the motor has been removed from the housing, ensure that the retaining rubbers are securely engaged.

Heater blower motor control unit

Removal

28 Remove the heater blower motor, then remove the blower motor from its housing, as described previously in this Section.

29 Disconnect the wiring connectors from the rear of the control unit.

30 Unscrew the securing screws, then withdraw the control unit from the motor housing (see illustration).

Refitting

31 Refitting is a reversal of removal.

Heater matrix – right-hand-drive models

Removal

Note: During this procedure, the heater matrix will almost certainly be irreparably damaged –

do not remove the matrix unless it is to be renewed. New heater matrix pipe O-rings will be required on refitting, and suitable adhesive or adhesive tape will be required to repair the matrix housing – see text.

32 Drain the cooling system as described in Chapter 1.

33 Remove the steering column, as described in Chapter 11.

34 Remove the securing screws and withdraw the carpet trim panel from under the driver's side of the fascia.

35 Unscrew the securing screws and lower the driver's side lower fascia panel. Unclip the instrument panel dimmer switch and the engine diagnostic connector from the panel, and withdraw the panel.

36 Place a suitable container beneath the heater matrix pipe connections, to catch the coolant which will escape as the pipes are disconnected.



Chock the front wheels, and release the parking brake before disconnecting the heater matrix pipes – this will move the parking brake pedal clear of the flow of coolant.

37 Remove the screw securing the heater matrix pipe clamping bracket, then slide the bracket back along the pipes (see illustration).

38 Pull the pipes from the matrix, and allow

the coolant to drain into the container. Recover the O-rings if they are loose (see illustration).

39 Unscrew the heater matrix securing screw(s) (see illustration).

40 Simultaneously release the three heater matrix securing clips, and pull the matrix from the housing. The matrix will almost certainly be irreparably damaged as it is removed, as the fins are pushed against the surrounding panels (see illustration).

Refitting

41 In order to avoid damaging the new heater matrix during refitting, it is necessary to cut away part of the housing – if care is taken, it will be possible to glue the removed portion back in position once the matrix has been refitted.

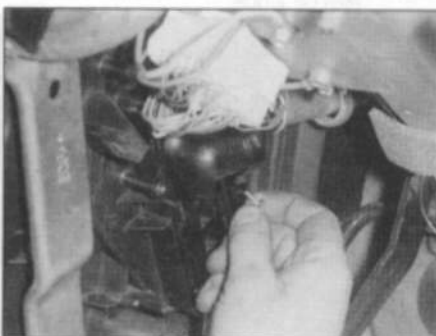
42 Using a suitable tool, cut away a section



9.37 Remove the screw (arrowed) securing the heater matrix pipe clamping bracket ...



9.38 ... then pull the pipes from the matrix



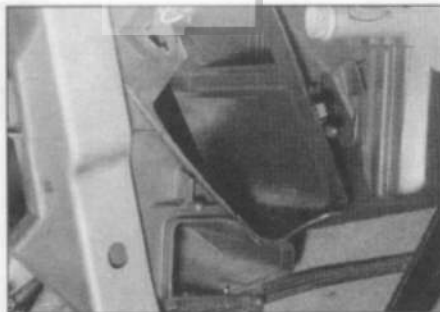
9.39 Unscrew the heater matrix securing screws



9.40 Removing the heater matrix



9.42a Cut away the front corner of the heater matrix housing ...



9.42b ... to allow clearance for the new matrix to be fitted without damage

from the front edge of the heater matrix housing, as shown (see illustrations).

43 Fit new O-rings to the heater matrix pipes, ensuring that they are correctly located (see illustration).

44 Carefully slide the new matrix into position in the housing, taking great care not to damage the fins (see illustration). Push the matrix fully home in the housing until the securing clips engage, then refit the matrix securing screw(s).

45 Using suitable adhesive, glue the removed section back into position at the front edge of the heater matrix housing. Alternatively, high-strength adhesive tape can be used to secure the removed section.

46 Reconnect the pipes to the matrix, ensuring that the O-rings locate correctly, then slide the clamping bracket into position, and refit and tighten the securing screw.

47 Further refitting is a reversal of removal, bearing in mind the following points.

- a) Refit the steering column as described in Chapter 11.
- b) On completion, refill the cooling system as described in Chapter 1.

Heater matrix – left-hand-drive models

Removal

48 New heater matrix pipe O-rings will be required on refitting.

49 Remove the securing screws and withdraw the carpet trim panel from under the passenger's side of the fascia.

50 If necessary, remove the heater blower motor, as described previously in this Section,

to provide sufficient clearance to withdraw the heater matrix.

51 If not already done, remove the securing screws and clips, and withdraw the passenger's side lower fascia panel.

52 Place a suitable container beneath the heater matrix pipe connections, to catch the coolant which will escape as the pipes are disconnected.

53 Proceed as described in paragraphs 37 to 40.

Refitting

54 Refitting is a reversal of removal, bearing in mind the following points.

- a) Fit new O-rings to the heater matrix pipes, ensuring that they are correctly located.
- b) Take care not to damage the heater matrix fins during refitting.
- c) Make sure that the O-rings locate correctly when reconnecting the pipes to the matrix.
- d) On completion, refill the cooling system as described in Chapter 1.

10 Air conditioning system – general information and precautions

General information

1 Air conditioning is available on certain models. 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 in 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 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 heater assembly, 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 operation of the system is controlled electronically. Any problems with the system should be referred to a Citroën dealer or an air conditioning specialist.

Precautions

6 It is necessary to observe special precautions whenever dealing with any part of the system, its associated components, and any items which necessitate disconnection of the system.



Warning: The refrigeration circuit contains a liquid refrigerant (Freon). This 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 it forms a poisonous gas; inhalation of the vapour through a lighted cigarette could prove fatal. Uncontrolled discharging of the refrigerant is dangerous, and potentially damaging to the environment. It is therefore dangerous to disconnect any part of the system without specialised knowledge and equipment. If for any reason the system must be disconnected, entrust this task to an authorised dealer or an air conditioning specialist.

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

11 Air conditioning system components – removal and refitting



Warning: Do not attempt to open the refrigerant circuit. Refer to the precautions in Section 10.

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

If necessary, the compressor can be unbolted and moved to one side, without disconnecting the flexible hoses, after removing the drivebelt.



9.43 Fit new O-rings to the heater matrix pipes ...



9.44 ... then slide the new matrix into the housing