

Chapter 3

Cooling system

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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

System type	Pressurised, front-mounted radiator (with integral expansion tank on BX models), coolant pump and thermostat. Electric cooling fan(s)	
Thermostat:		
Pre 1987 models:		
Starts to open at	82°C	
1987-on models:		
except BX Turbo and C15 Vans	88°C	
BX Turbo	83°C	
C15 Van	89°C	
Radiator cap pressure	1 bar	
Temperature warning switch operating temperature	103 to 107°C	
Emergency temperature warning switch (yellow connector) operating temperature	110 to 114°C	
Cooling fan(s):		
Except BX Turbo and C15:		
1st speed cuts in at	86 to 90°C	
2nd speed cuts in at	90 to 94°C	
BX Turbo:		
1st speed cuts in at	93°C	
2nd speed cuts in at	97°C	
C15 Van:		
1st speed cuts in at	88°C	
2nd speed cuts in at	92°C	

Torque wrench settings

	Nm	lbf ft
Water pump	12	9

1 Description - general

The cooling system is pressurised with a front-mounted radiator and a water pump driven by the engine timing belt. The thermostat is located on the flywheel end of the cylinder block, and enables the engine to achieve a fast warm-up period by initially restricting the coolant flow within the engine and heater circuits. Thereafter, the coolant flows through the radiator to provide additional cooling. The main engine temperature control is provided by one or two electric cooling fans mounted in front of the radiator. Visa models have two separate fans and BX models a single twin-speed fan. In both cases a twin action sensor in the radiator activates the fan(s) according to the coolant temperature (see illustrations).

Essential to the operation of the system is the expansion tank, integral with the radiator on BX models or separate on Visa models. This tank provides a reservoir to allow for expansion and contraction of the coolant with changes in temperature. It also incorporates a filler/pressure relief valve cap.

The radiator is of the crossflow type, with plastic side tanks. A temperature warning switch is provided on the water outlet from the cylinder head to warn the driver of excessive temperature. An additional warning switch is also provided on BX models which operates at the "emergency" temperature and causes the warning lamp to remain on permanently as against the flashing warning lamp activated at the lower temperature.

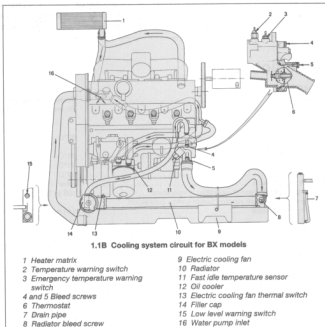
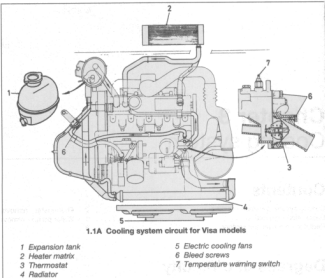
The basic cooling system on BX Turbo models is similar to that described for other BX models, except for the addition of a remote expansion tank. The radiator is specific to Turbo models, as are the water pump and radiator cooling fans (see illustration).

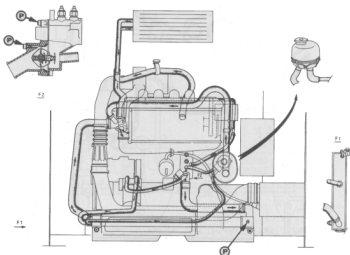
From 1989 model year to early 1993, on Visa (and C15) models, the remote expansion tank is no longer fitted. The cooling system filler/pressure cap is now on the radiator, at the right-hand end. The radiator, hoses and surrounding components are modified (see illustration).

At the same time, the electric fuel heater fitted to some models was discontinued. A coolant-fed fuel heater is fitted instead. This is mounted on the rear face of the engine block, at the timing belt end (see illustration). If it has to be removed or disconnected for any reason, note the arrow showing the direction of fuel flow.

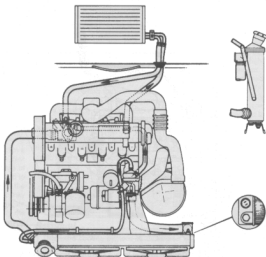
From early 1993, on the C15 models the fuel heater is no longer mounted on the rear of the engine block. Instead, the fuel is heated using a special filter housing on the front of the cylinder head (see Chapter 4 for more details) (see illustration).

When the BX diesel is used for towing loads

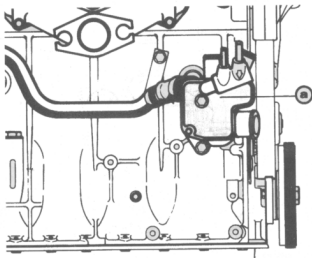




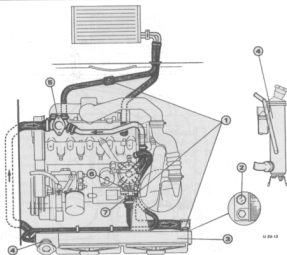
1.4 Cooling system layout - BX Turbo models
P Bleed screws



1.5 Cooling system layout - Visa/C15 Van, 1989 to early 1993

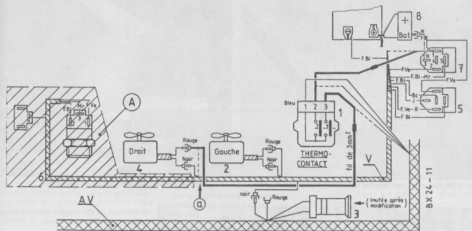


1.6 Fuel heater (a) on the rear face of the block



1.7 Cooling system layout - C15 Van from early 1993

- | | | |
|---------------------------|---------------|-----------------|
| 1 Bleed screws | 4 Header tank | 6 Thermo-switch |
| 2 Two-stage thermo-switch | 5 Water pump | 7 Thermostat |
| 3 Radiator | | |



1.8 Additional cooling fan on BX models

- 1 Two-stage fan switch
- 2 Original cooling fan
- 3 Resistor
- 4 Additional cooling fan

- 5 Fan speed inverter relay
- 6 Wiring harness
- 7 High-speed relay

- 8 Battery connection
- A Old wiring
- a Connection to new fan

of more than 650 kg, Citroën recommend that an additional cooling fan is fitted to the radiator (see illustration). All of the parts necessary to carry out the modification are obtainable from a Citroën dealer.

If the existing cooling fan control switch is fitted to the left-hand side of the radiator, it will also be necessary to obtain a new wiring harness.

2 Cooling system pressure - testing

1 In cases where leakage is difficult to trace a pressure test can prove helpful. The test involves pressurising the system by means of a hand pump and an adapter which is fitted to the expansion tank or radiator in place of the filler cap. The resourceful home mechanic may be able to improvise the apparatus using an old filler cap and a tyre valve, alternatively the test can be performed by a Citroën garage.

2 Fit the test equipment to the expansion tank or radiator then run the engine to normal operating temperature and switch it off.

3 Apply 1.4 bar pressure and check that this pressure is held for at least 10 seconds. If the pressure drops prematurely there is a leak in the cooling system which must be traced and rectified.

4 Besides leaks from hoses, pressure can also be lost through leaks in the radiator and heater matrix. A blown head gasket or a cracked head or block can cause an "invisible" leak, but there are usually other clues to this condition such as poor engine performance, regular misfiring, or combustion gases entering the coolant.

5 After completing the test, allow the engine to cool then remove the test equipment.

6 The condition of the filler cap must not be overlooked. Normally it is tested with similar equipment to that used for the pressure test. The release pressure is given in the Specifications and is also usually stamped on the cap itself. Renew the cap if it is faulty.

3 Radiator - removal and refitting

Removal

1 Drain the cooling system as described in Chapter 1.

2 Remove the air cleaner as described in Chapter 4.

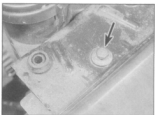
3 Loosen the clips and disconnect the top hose, bottom hose, and bypass hose from the radiator.

4 On Visa models disconnect the bonnet release cable from its catch and unbolt the crossmember. Lift the crossmember from the top of the radiator.

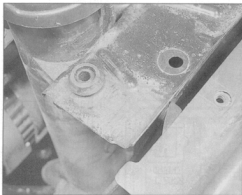
5 Disconnect the wiring from the thermal switch on the right-hand side of the radiator. Also disconnect the coolant level warning switch (when fitted).

6 On Visa models remove the front grille panel then remove one headlamp unit and detach the fan cowl.

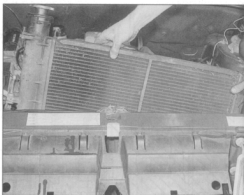
7 On BX models unscrew the bolts and lift the crossmember from the top of the radiator (see illustrations).



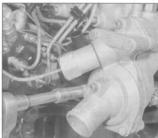
3.7A Radiator top crossmember retaining bolt - arrowed (BX models)



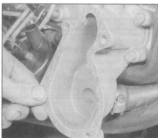
3.7B Removing the radiator top crossmember (BX models)



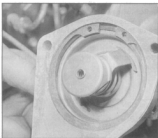
3.8 Removing the radiator on BX models



4.3A Unscrewing the thermostat housing cover bolts



4.3B Removing the thermostat housing cover gasket



4.4 Thermostat and retaining circlip



4.5 Removing the rubber seal from the thermostat

8 Carefully lift the radiator from the engine compartment (see illustration).

Refitting

9 Refitting is a reversal of removal. Refill the system as described in Chapter 1.

4 Thermostat - removal, testing and refitting

Removal

1 Drain the cooling system as described in Chapter 1.

2 Loosen the clip and disconnect the top hose from the thermostat housing cover.

3 Unscrew the four bolts and remove the thermostat housing cover from the cylinder head water outlet. There is no need to disconnect the fast idle cable. Remove the gasket (see illustrations).

4 Using circlip pliers, extract the circlip from the cover and lift out the thermostat (see illustration).

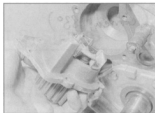
5 If necessary pull the rubber seal from the thermostat (see illustration).

Testing

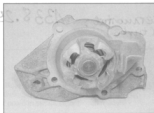
6 To test the thermostat place it in a pan of cold water and check that it is initially closed. Heat the water and check that it commences to open at the temperature given in Specifications. Continue to heat the water and check



5.5A Unscrew the bolts ...



5.5B ... and withdraw the water pump



5.5C Water pump showing impeller vanes

the fully open temperature and minimum travel. Finally allow the water to cool and check that it fully closes. Discard it if it is faulty.

Refitting

7 Refitting is a reversal of removal, but when inserting the thermostat in the cover, position the vent hole uppermost and also fit a new gasket. Refill the system as described in Chapter 1.

5 Water pump - removal and refitting



Removal

- 1 Disconnect the battery negative lead.
- 2 Remove the timing belt as described in Chapter 2.
- 3 Drain the cooling system as described in Chapter 1.
- 4 To provide additional working room loosen the clips and remove the bottom hose.
- 5 Unscrew the bolts and withdraw the water

pump from the cylinder block (see illustrations). Remove the gasket.

Refitting

- 6 Clean the mating faces of the water pump and block.
- 7 Fit the water pump together with a new gasket, insert the bolts, and tighten them evenly to the specified torque.
- 8 Reconnect the bottom hose if removed.
- 9 Refit the timing belt as described in Chapter 2.
- 10 Reconnect the battery negative lead.
- 11 Refill the cooling system as described in Chapter 1.