

# 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

#### Coolant

Mixture type and capacity ..... see Chapter 1

#### Cooling fan switch

Switch closes (fan ON) ..... 102 to 108°C  
Switch opens (fan OFF) ..... 98 to 92°C

#### Temperature gauge sender

Resistance @ 50°C ..... 154 ohms  
Resistance @ 80°C ..... 47 to 57 ohms  
Resistance @ 100°C ..... 26 to 30 ohms

#### Thermostat

Opening temperature ..... 80 to 84°C  
Fully open ..... 95°C  
Valve lift ..... 8 mm (min)

#### Radiator

Cap valve opening pressure ..... 10 to 15 psi (0.69 to 1.03 Bar)

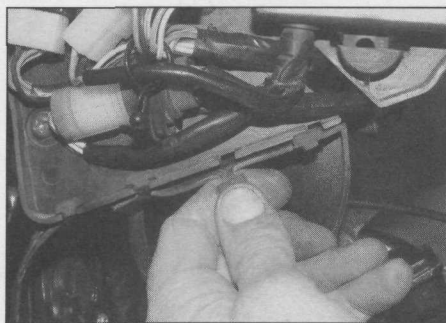
#### Water pump

Impeller shaft tilt (max) ..... 0.15 mm

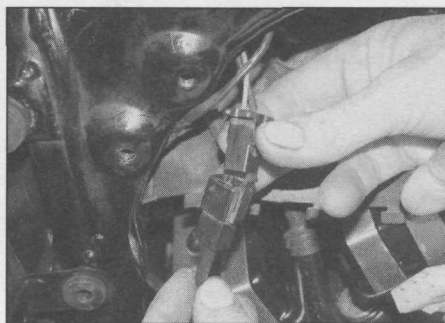
#### Torque settings

Cooling system drain bolt (on water pump) ..... 43 Nm  
Fan switch ..... 15 Nm  
Temperature sender ..... 15 Nm  
Thermostat housing bolts ..... 10 Nm  
Thermostat cover bolts ..... 7 Nm  
Water pump cover bolts ..... 10 Nm  
Water pump housing bolts ..... 10 Nm

## 3•2 Cooling system



3.2a Free the tabs from the board . . .



3.2b . . . and disconnect the fan wiring connector

### 1 General information

The cooling system uses a water/antifreeze coolant to carry away excess heat from the engine and maintain as constant a temperature as possible. The cylinders are surrounded by a water jacket from which the heated coolant is circulated by thermo-siphonic action in conjunction with a water pump, which is driven by the balancer shaft. The hot coolant passes through the filler neck, which incorporates the fan switch and temperature sender, into the radiator and across its core, then over the thermostat and onto the water pump and back to the engine where the cycle is repeated.

A thermostat is fitted in the system to prevent the coolant flowing through the radiator when the engine is cold, therefore accelerating the speed at which the engine reaches normal operating temperature. The sender mounted in the thermostat housing transmits information to the temperature gauge on the instrument panel. A cooling fan fitted to the back of the radiator aids cooling in extreme conditions by drawing extra air through. The fan motor is controlled by a thermostatic switch fitted in the filler neck.

The complete cooling system is partially sealed and pressurised, the pressure being controlled by a valve contained in the spring-loaded radiator cap. By pressurising the coolant the boiling point is raised, preventing

premature boiling in adverse conditions. The overflow pipe from the system is connected to a reservoir into which excess coolant is expelled under pressure. The discharged coolant automatically returns to the radiator by the vacuum created when the engine cools.



**Warning:** Do not remove the pressure cap from the filler neck when the engine is hot. Scalding hot coolant and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, place a thick rag, like a towel, over the pressure cap; slowly rotate the cap anti-clockwise to the first stop. This procedure allows any residual pressure to escape. When the steam has stopped escaping, press down on the cap while turning it anti-clockwise and remove it. **Caution:** Do not allow antifreeze to come in contact with your skin or painted surfaces of the motorcycle. Rinse off any spills immediately with plenty of water. Antifreeze is highly toxic if ingested. Never leave antifreeze lying around in an open container or in puddles on the floor; children and pets are attracted by its sweet smell and may drink it. Check with the local authorities about disposing of used antifreeze. Many communities will have collection centres which will see that antifreeze is disposed of safely. **Caution:** At all times use the specified type of antifreeze, and always mix it with distilled water in the correct proportion. The antifreeze contains corrosion inhibitors which are essential to avoid

damage to the cooling system. A lack of these inhibitors could lead to a build-up of corrosion which would block the coolant passages, resulting in overheating and severe engine damage. Distilled water must be used as opposed to tap water to avoid a build-up of scale which would also block the passages.

### 2 Radiator pressure cap – check

1 If problems such as overheating or loss of coolant occur, check the entire system as described in Chapter 1. The radiator cap opening pressure should be checked by a Yamaha dealer with the special tester required to do the job. If the cap is defective, replace it with a new one.

### 3 Cooling fan and fan switch – check and replacement

#### Cooling fan

##### Check

1 If the engine is overheating and the cooling fan isn't coming on, first check the cooling fan circuit fuse (see Chapter 9). If the fuse is good, check the fan switch as described below.

2 To test the cooling fan motor, remove the left-hand side cover (see Chapter 8). Free the front cylinder heat shield tabs from the electrical component board, noting how it locates (see illustration). Trace the wiring from the fan motor and disconnect it at the connector (see illustration).

3 Using a 12 volt battery and two jumper wires with suitable connectors, connect the battery positive (+ve) lead to the blue wire terminal on the fan side of the wiring connector, and the battery negative (–ve) lead to the black wire terminal. Once connected the fan should operate. If it doesn't, and the wiring is all good, then the fan motor is faulty.

##### Replacement



**Warning:** The engine must be completely cool before carrying out this procedure.

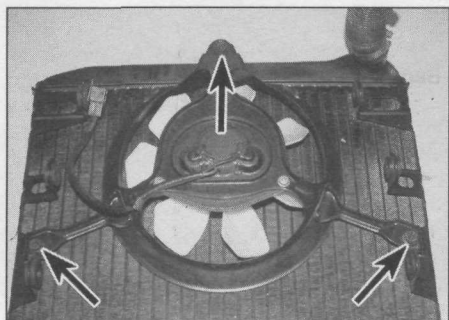
4 Remove the radiator (see Section 6).

5 Unscrew the bolts securing the fan assembly to the radiator (see illustration).

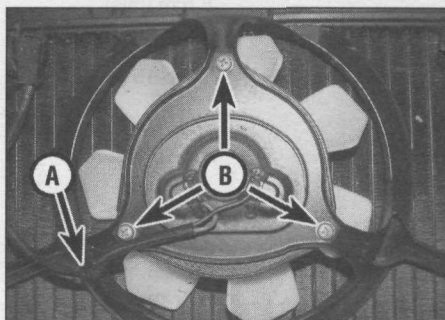
6 Free the fan wiring from its guide on the fan shroud (see illustration). Unscrew the fan blade nut, noting the washers, and remove the blade. Undo the three screws securing the fan motor and separate the motor from the shroud.

7 Installation is the reverse of removal. Apply a suitable non-permanent thread locking compound to the fan blade nut.

8 Install the radiator (see Section 6).

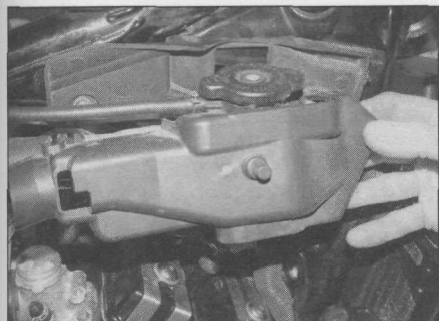


3.5 Unscrew the bolts (arrowed) and remove the fan assembly



3.6 Fan wiring guide (A), fan motor screws (B)





3.10a Remove the cover ...

### Cooling fan switch

#### Check

9 If the engine is overheating and the cooling fan isn't coming on, first check the cooling fan circuit fuse (see Chapter 9). If the fuse is blown, check the fan circuit for a short to earth (see the wiring diagrams at the end of this book).

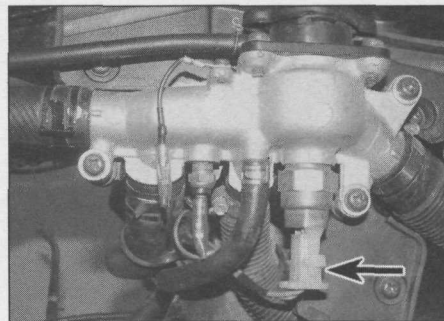
10 If the fuse is good, remove the right-hand side cover (see Chapter 8). Remove the filler neck cover – there are no fasteners, it just locates round the neck (see illustration). Disconnect the wiring connector from the fan switch (see illustration). Check that there is battery voltage at the brown wire terminal on the loom side of the connector with the ignition ON. If not, check the wiring and connections as described in Chapter 9, following the relevant Wiring Diagram. Turn the ignition OFF.

11 If the voltage is good, connect the across the wiring connector terminals using a jumper wire. Turn the ignition switch ON. The fan should come on. If it does, the fan switch is defective and must be replaced with a new one. If it does not come on, check for continuity in the blue wire between the switch connector and the fan motor wiring connector. If continuity is present, test the fan motor itself (see above). If the fan is good, check for continuity to earth in the black wire from the fan motor wiring connector.

12 If the fan is on the whole time, disconnect the switch wiring connector (see illustration 3.10b). The fan should stop. If it does, the switch is defective and must be replaced with a new one.

13 If the fan works but is suspected of cutting in at the wrong temperature, a more comprehensive test of the switch can be made as follows.

14 Remove the switch (see Steps 16 and 17). Fill a small heatproof container with coolant and place it on a stove. Connect the positive (+ve) probe of an ohmmeter to the brown wire terminal on the switch and the negative (-ve) probe to the blue wire terminal, and using some wire or other support suspend the switch in the coolant so that just the sensing portion and the threads are submerged (see illustration). Also place a thermometer



3.10b ... then disconnect the wiring connector from the switch (arrowed)

capable of reading temperatures up to 120°C in the coolant so that its bulb is close to the switch. **Note:** None of the components should be allowed to directly touch the container.

15 Initially the ohmmeter reading should be very high indicating that the switch is open (OFF). Heat the coolant, stirring it gently.



**Warning:** This must be done very carefully to avoid the risk of personal injury.

When the temperature reaches around 102 to 108°C the meter reading should drop to around zero ohms, indicating that the switch has closed (ON). Now turn the heat off. As the temperature falls between 98 to 92°C the meter reading should show infinite (very high) resistance, indicating that the switch has opened (OFF). If the meter readings obtained are different, or they are obtained at different temperatures, then the switch is faulty and must be replaced with a new one. On completion, fit the switch as described in Steps 18 and 19.

#### Replacement

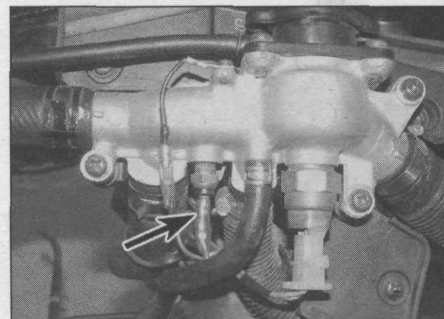


**Warning:** The engine must be completely cool before carrying out this procedure.

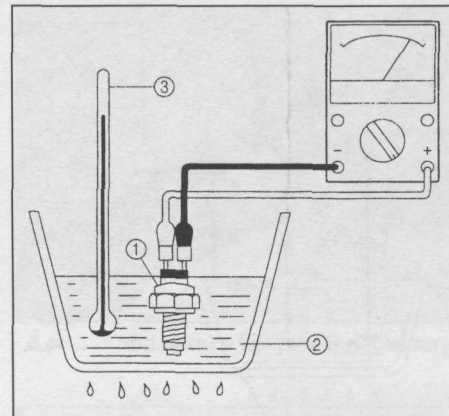
16 Drain the cooling system (see Chapter 1). Remove the filler neck cover – there are no fasteners, it just locates round the neck (see illustration 3.10a).

17 Disconnect the wiring connector from the fan switch (see illustration 3.10b). Unscrew the switch and withdraw it from the filler neck.

18 Install the switch using some suitable sealant (such as Three Bond Sealock#10) on



4.2 Disconnect the wiring connector from the temperature sender (arrowed)



3.14 Cooling fan switch testing set-up

- |              |               |
|--------------|---------------|
| 1 Fan switch | 3 Thermometer |
| 2 Coolant    |               |

the threads, and tighten it to the torque setting specified at the beginning of the Chapter.

19 Reconnect the switch wiring and refill the cooling system (see Chapter 1).

### 4 Temperature gauge and sender – check and replacement

#### Coolant temperature gauge

##### Check

1 The circuit consists of the sender mounted in the radiator filler neck and the gauge mounted in the instrument panel on the top cover. If the system malfunctions check first that the battery is fully charged and that the signal circuit fuse is good. If they are, remove the right-hand side cover (see Chapter 8). Remove the filler neck cover – there are no fasteners, it just locates round the neck (see illustration 3.10a).

2 Disconnect the wire from the temperature sender and turn the ignition switch ON (see illustration). The temperature gauge needle should be on the 'C' on the gauge. Now earth the sender wire on the engine. The needle should swing immediately over to the 'H' on the gauge.

**Caution:** Do not earth the wire for any longer than is necessary to take the reading, or the gauge may be damaged.

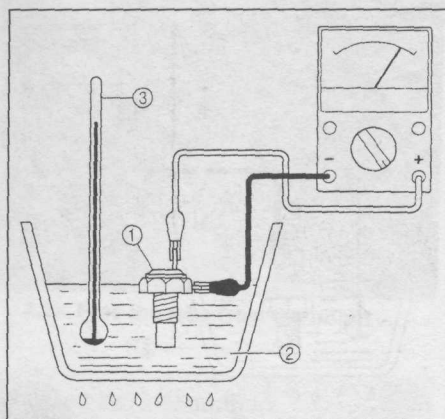
If the needle moves as described above, the sender is proven defective and must be replaced with a new one (see below).

3 If the needle movement is still faulty, or if it does not move at all, the fault lies in the wiring or the gauge itself. Check all the relevant wiring and wiring connectors (see Chapter 9). If all appears to be well, the gauge is defective and must be replaced with a new one.

##### Replacement

4 See Chapter 9.

## 3•4 Cooling system



4.8 Temperature sender testing set-up

- |                      |               |
|----------------------|---------------|
| 1 Temperature sender | 2 Coolant     |
|                      | 3 Thermometer |

### Temperature sender

#### Check

5 Drain the cooling system (see Chapter 1). The temperature sender is mounted in the radiator filler neck. Remove the right-hand side cover (see Chapter 8). Remove the filler neck cover – there are no fasteners, it just locates round the neck (see illustration 3.10a).

6 Disconnect the wiring connector from the sender (see illustration 4.2). Using a continuity tester, check for continuity between the sender body and earth (ground). There should be continuity. If there is no continuity, check the earth wire terminal screw on the top of the filler

neck body is tight, then check the bullet connector, then check for continuity in the wire to earth. If there is none, repair the wiring.

7 Remove the sender (see Steps 9 and 10 below).

8 Fill a small heatproof container with water and place it on a stove. Using an ohmmeter, connect the positive (+ve) probe of the meter to the terminal on the sender, and the negative (-ve) probe to the body of the sender. Using some wire or other support suspend the sender in the coolant so that just the sensing portion and the threads are submerged. Also place a thermometer capable of reading temperatures up to 110°C in the water so that its bulb is close to the sender (see illustration). **Note:** None of the components should be allowed to directly touch the container. Heat the coolant, stirring it gently.



**Warning:** This must be done very carefully to avoid the risk of personal injury.

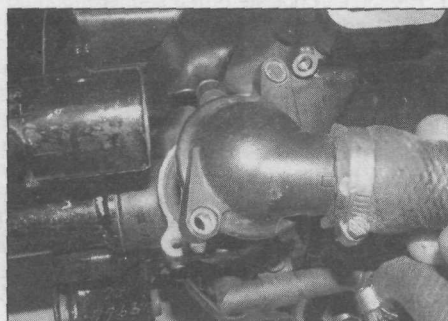
When the temperature reaches around 50°C the meter should read between 154 ohms. When the temperature reaches around 80°C

the meter should read between 26 and 30 ohms. When the temperature reaches around 100°C the meter should read between 26 and 30 ohms. If the meter readings obtained are different, or they are obtained at different temperatures, then the sender is faulty and must be replaced with a new one.

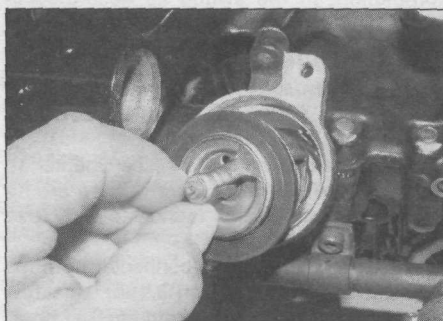
#### Replacement



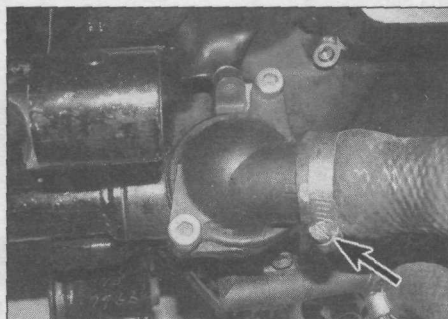
**Warning:** The engine must be completely cool before carrying out this procedure.



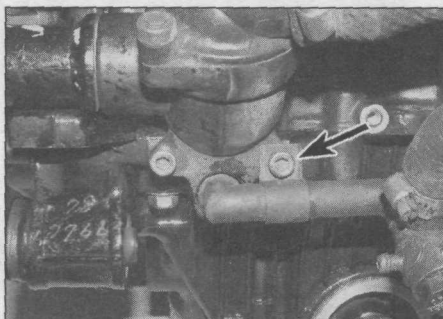
5.3a Unscrew the bolts and detach the cover ...



5.3b ... then withdraw the thermostat from the housing



5.4a Slacken the clamp screw (arrowed) and detach the hose from the cover



5.4b Unscrew the bolt (arrowed) ...

9 Drain the cooling system (see Chapter 1). The sender is mounted in the radiator filler neck. Remove the right-hand side cover (see Chapter 8). Remove the filler neck cover – there are no fasteners, it just locates round the neck (see illustration 3.10a).

10 Disconnect the wiring connector from the sender (see illustration 4.2). Unscrew the sender and withdraw it from the filler neck.

11 Install the switch using some suitable sealant (such as Three Bond Sealock#10) on the threads, and tighten it to the torque setting specified at the beginning of the Chapter.

12 Reconnect the sender wiring and refill the cooling system (see Chapter 1).

## 5 Thermostat and housing – removal, check and installation



### Removal



**Warning:** The engine must be completely cool before carrying out this procedure.

1 The thermostat is automatic in operation and should give many years service without requiring attention. In the event of a failure, the valve will probably jam open, in which case the engine will take much longer than normal to warm up. Conversely, if the valve jams shut, the coolant will be unable to circulate and the engine will overheat. Neither condition is acceptable, and the fault must be investigated promptly.

2 Drain the cooling system (see Chapter 1). The thermostat housing is on the front of the engine in the middle.

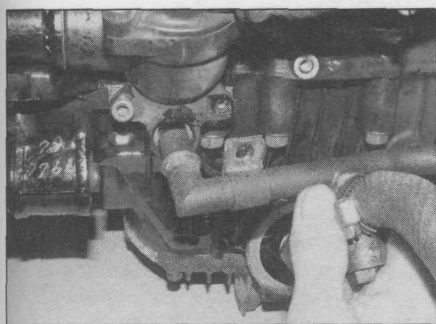
3 To remove the thermostat, you either need to remove the front cylinder exhaust down-pipes to access the bolts (see Chapter 4), or to remove the housing first (see Step 4). Having done either of those, unscrew the two bolts securing the cover and detach it from the housing (see illustration). Discard the O-ring as a new one must be used. Withdraw the thermostat, noting how it fits (see illustration).

4 To remove the thermostat housing, slacken the clamp securing the hose to the cover and detach it (see illustration). Unscrew the right-hand housing mounting bolt, noting how it secures the drain valve pipe, and draw the pipe out (see illustrations). Discard the O-ring, which will probably be in the housing (see illustration 5.9b). Unscrew the left-hand housing mounting bolt, then grasp the pipe to the water pump and draw it out of the pump cover as you remove the thermostat housing – it may be necessary to lever the pipe at the joint to overcome the O-ring (see illustration). If required, draw the water pump pipe out of the thermostat housing (see illustration). Discard the pipe O-rings (see illustration 5.9a).

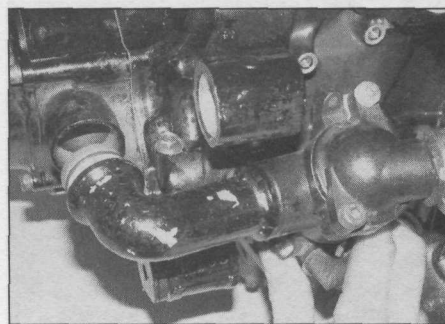
### Check

5 Examine the thermostat visually before carrying out the test. If it remains in the open





5.4c ... and draw the pipe out



5.4d Remove the thermostat housing along with the pipe ...



5.4e ... and detach the pipe if necessary

position at room temperature, it should be replaced with a new one. Check the condition of the rubber seal around the thermostat and replace it with a new one if it is damaged, deformed or deteriorated.

6 Suspend the thermostat by a piece of wire in a container of cold water. Place a thermometer capable of reading temperatures up to 110°C in the water so that the bulb is close to the thermostat (see illustration). Heat the water, noting the temperature when the thermostat opens, and compare the result with the specifications given at the beginning of the Chapter. Also check the amount the valve opens after it has been heated for a few minutes and compare the measurement to the specifications. If the readings obtained differ from those given, the thermostat is faulty and must be replaced with a new one.

7 In the event of thermostat failure, as an emergency measure only, it can be removed and the machine used without it (this is better than leaving a permanently closed thermostat in, but if it is permanently open, you might as well leave it in). **Note:** Take care when starting the engine from cold as it will take much longer than usual to warm up. Ensure that a new unit is installed as soon as possible.

### Installation

8 To install the thermostat, first make sure the seal is fitted around it and that it is in good condition, otherwise use a new one (see illustration). Smear some clean coolant over the seal. Install the thermostat with the hole facing the back of the housing and make sure it locates correctly (see illustration 5.3b). Fit the cover onto the housing using a new O-ring, then install the bolts and tighten them to the specified torque setting (see illustration). Install the front cylinder exhaust downpipes (see Chapter 4), or the housing (see Step 9), as required.

9 To install the thermostat housing, fit a new O-ring smeared with grease onto each end of the water pump pipe (see illustration). Fit the pipe into the housing, making sure the O-ring locates correctly (see illustration 5.4e). Install the housing, locating the pipe into the water pump cover as you do, again making sure the O-ring locates (see illustration 5.4d). Install the left-hand housing mounting bolt. Fit a new

O-ring smeared with grease into the socket for the drain pipe (see illustration). Fit the pipe into the housing and secure it with the right-hand mounting bolt (see illustrations 5.4c and b). Tighten both mounting bolts to the torque setting specified at the beginning of the Chapter. Attach the hose to the cover and tighten the clamp (see illustration 5.4a). 10 Refill the cooling system (see Chapter 1).

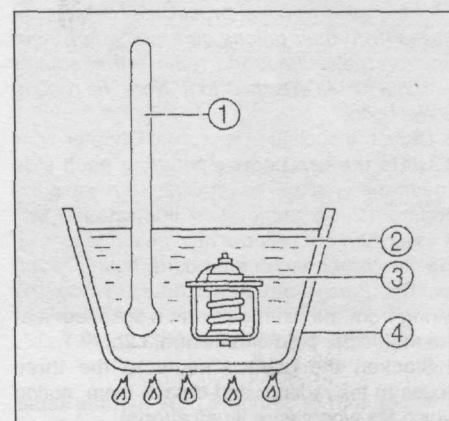
## 6 Radiator – removal and installation

### Removal



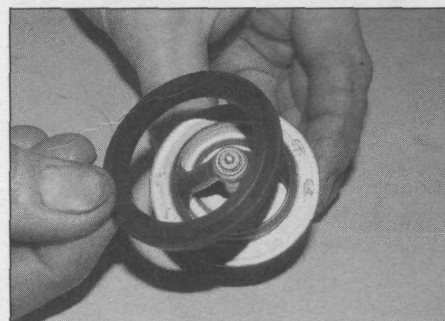
**Warning:** The engine must be completely cool before carrying out this procedure.

**Note:** If the radiator is being removed as part

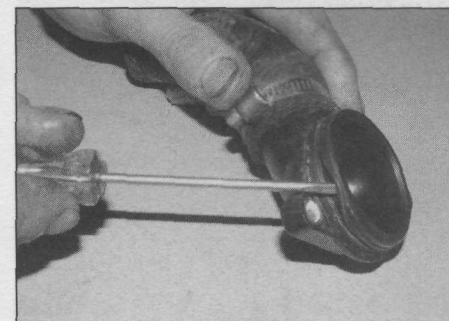


5.6 Thermostat testing set-up

- |               |              |
|---------------|--------------|
| 1 Thermometer | 3 Thermostat |
| 2 Water       | 4 Container  |



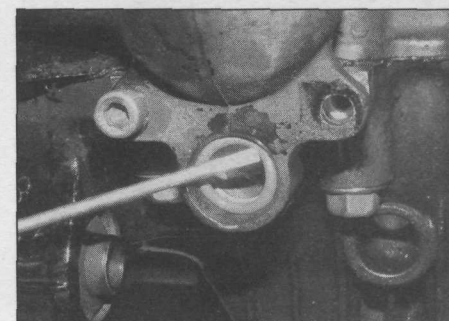
5.8a Fit a new thermostat seal if necessary



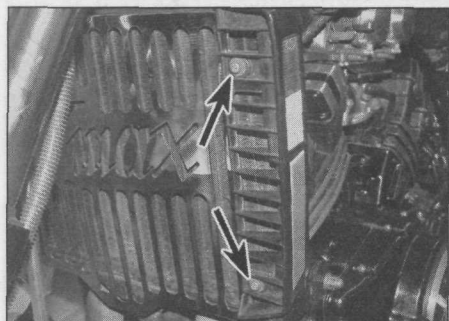
5.8b Install the cover using a new O-ring



5.9a Fit a new O-ring onto each end of the pipe



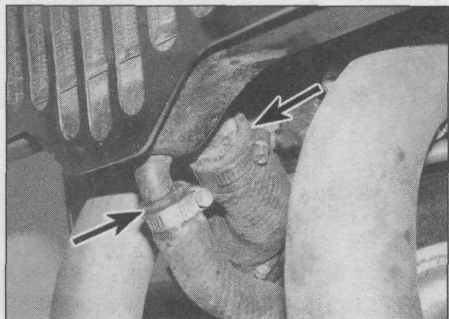
5.9b Fit a new O-ring into the housing



6.2a Undo the screws (arrowed) ...

of the engine removal procedure, detach the hoses from their unions on the engine rather than on the radiator and remove the radiator with the hoses attached to it. Note the routing of the hoses.

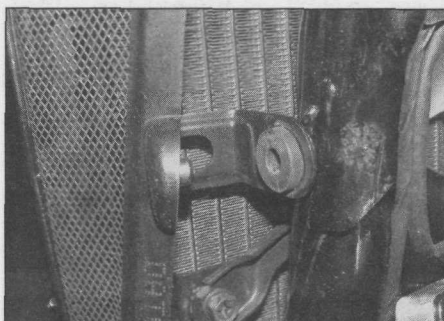
- 1 Drain the cooling system (see Chapter 1).
- 2 Undo the two screws securing each side cover, then pull the cover away to release the peg from the grommet (see illustrations).
- 3 Free the front cylinder heat shield tabs from the electrical component board, noting how it locates (see illustration 3.2a). Trace the wiring from the fan motor and disconnect it at the connector (see illustration 3.2b).
- 4 Slacken the clamps securing the three hoses to the radiator and detach them, noting which fits where (see illustrations).
- 5 Unscrew the radiator mounting bolts (two on each side) and remove the collars, then remove the radiator (see illustrations).
- 6 If necessary, remove the cooling fan from



6.4b ... and the hoses (arrowed) from the front



6.5b ... and remove the radiator



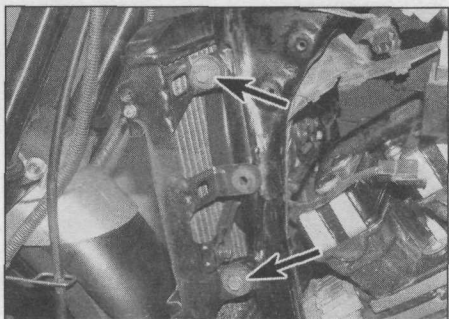
6.2b ... then pull the cover away to release the peg from the grommet

the radiator (see Section 3). Check the radiator for signs of damage and clear any dirt or debris that might obstruct air flow and inhibit cooling. If the radiator fins are badly damaged or broken the radiator must be replaced with a new one. Also check the rubber mounting grommets, and replace them with new ones if they are damaged deformed or deteriorated (see illustration).

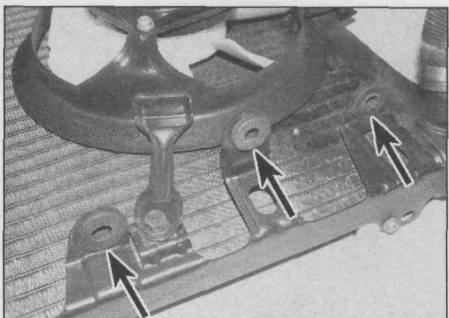
### Installation

7 Installation is the reverse of removal, noting the following.

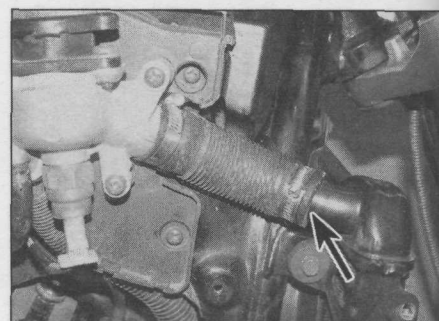
- Make sure the rubber grommets are correctly located in their mounts (see illustration 6.6).
- Make sure that the collars with the longer bodies fit in the thicker grommets on the left-hand radiator mounts (see illustration).
- Make sure that the fan wiring is correctly connected.



6.5a Unscrew the two bolts (arrowed) on each side ...



6.6 Check the mounting rubbers (arrowed) on each side



6.4a Detach the hose (arrowed) from the right-hand side of the radiator ...

- Ensure the coolant hoses are in good condition (see Chapter 1), and are securely retained by their clamps, using new ones if necessary.
- On completion refill the cooling system as described in Chapter 1.

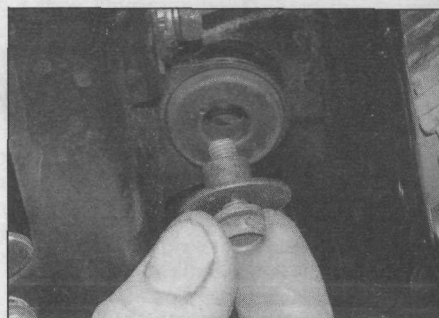
### 7 Water pump – check, removal, inspection and installation

#### Check

- 1 The water pump is located on the lower right-hand side of the engine at the front. Visually check the area around the pump for signs of leakage.
- 2 To prevent leakage of coolant from the cooling system to the lubrication system and vice versa, two seals are fitted on the pump shaft. The seal on the water pump side is of the mechanical type which bears on the inner face of the impeller. The second seal, which is mounted behind the mechanical seal, is of the normal feathered lip type. If on inspection of either the coolant or the engine oil there are signs of leakage between them (when oil and coolant mix they form a milky sludge), remove the pump and replace the seals with new ones (see below).

#### Removal

- 3 Drain the coolant (see Chapter 1). Do not yet re-install the drain bolt as it obstructs the bottom housing bolt.
- 4 Unscrew the water pump cover bolts and



6.7 Make sure the collars are correctly installed



remove the cover (*see illustration*). Remove the O-ring and discard it as a new one must be used.

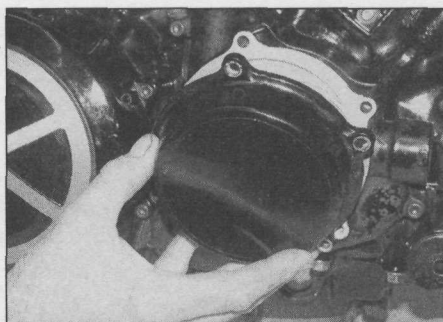
5 Unscrew the remaining pump housing bolts (three are common with the cover) and remove the housing, noting how the pipe at the front locates in the thermostat housing – it may be necessary to lever the pipe at the joint to overcome the O-ring (*see illustration*). Remove the O-ring from the pipe and the gasket from the housing or crankcase and discard them as new ones must be used. Separate the pipe from the housing if required, and if so again remove and discard the O-ring. Remove the dowels from either the housing or the crankcase if they are loose.

### Inspection, disassembly and seal renewal

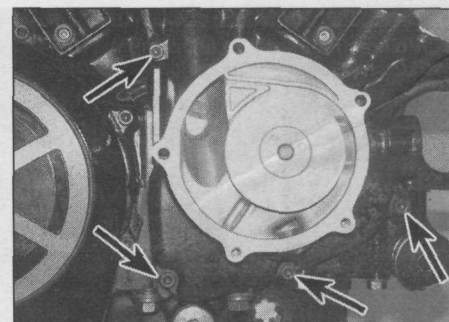
6 Wiggle the water pump impeller back-and-forth and in-and-out. If there is excessive movement, disassemble the pump (see Step 8) and check for wear and damage, fitting new components as required. Also check for corrosion or a build-up of scale in the pump body and clean or replace the components as necessary.

7 If there is any evidence of a milky sludge caused by the mixing of coolant and oil (see Step 2), disassemble the pump and replace the seals with new ones as follows:

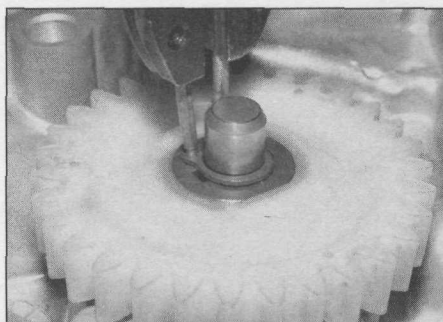
8 Remove the circlip from the end of the pump shaft and remove the driven gear, noting how it locates over the drive pin in the shaft (*see illustration*). Withdraw the pin (*see illustration*). Remove the circlip securing the



7.4 Remove the pump cover ...



7.5 ... then unscrew the bolts (arrowed) and remove the housing



7.8a Remove the circlip and slide the gear off the shaft ...



7.8b ... then remove the drive pin

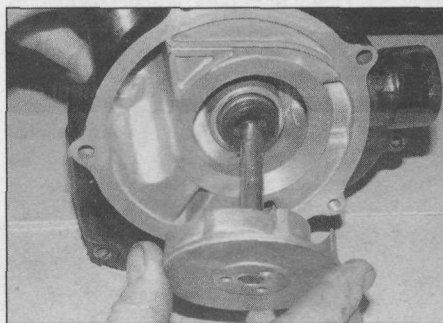
impeller and withdraw the impeller from the housing (*see illustrations*).

9 Using a suitable drift (a 9 mm socket is ideal) inserted from the impeller side of the housing drive the bearing and oil seal out (*see*

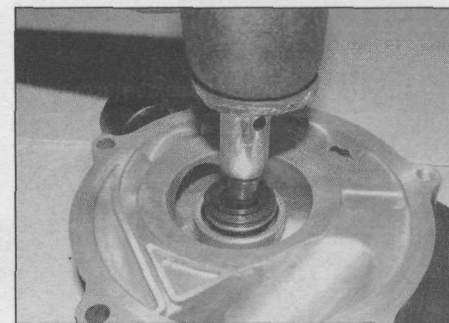
*illustrations*). With a drift (a 15 mm socket is ideal) now applied from the shaft side, drive the mechanical seal out – note that the mechanical seal is likely to be tight (*see illustrations*).



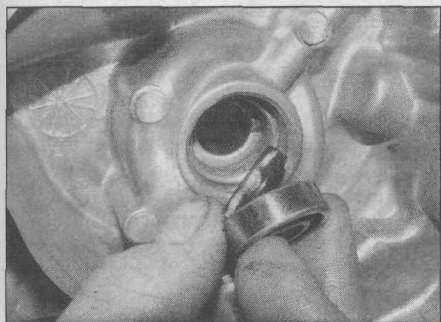
7.8c Remove the circlip ...



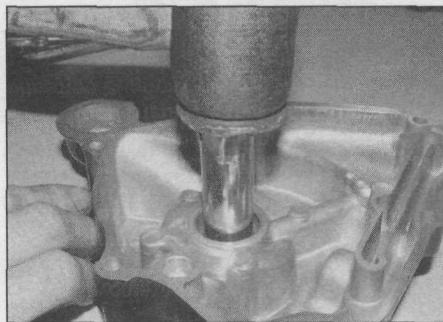
7.8d ... and withdraw the impeller from the housing



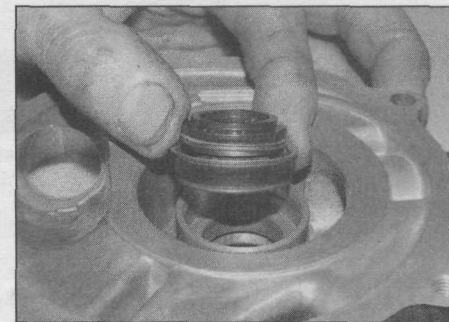
7.9a Using a 9 mm socket as shown ...



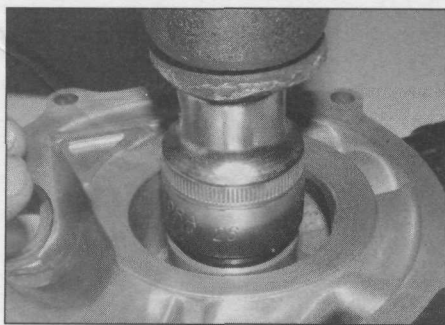
7.9b ... drive the bearing and oil seal out



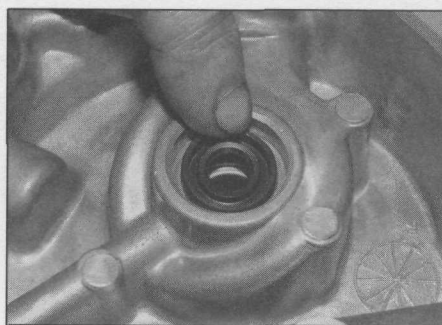
7.9c Using a 15 mm socket as shown ...



7.9d ... drive the mechanical seal out



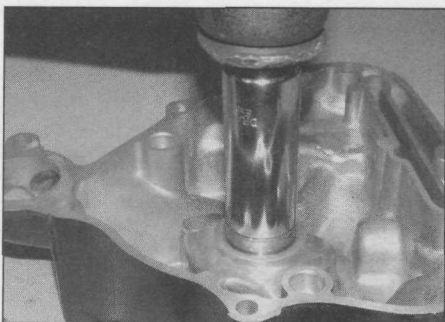
7.10a Drive the mechanical seal in using a 26 mm socket



7.10b Fit the oil seal ...



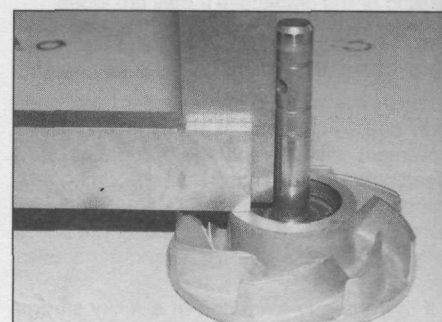
7.10c ... and drive it in using a 16 mm socket until the side being driven in is flush with the rim of the bore



7.10d Drive the bearing in using a 19 mm socket



7.11a Lever out the seal seat and damper ...



7.11b ... and check the shaft for tilt

10 The new mechanical seal should come with sealant already applied round its inner rim, but if there is none, apply some (see illustration 7.9d). Drive the seal into the housing from the outside using a 26 mm

socket, or a tube that bears only on the outer rim of the seal body, until the rim seats on the hub (see illustration). Drive the oil seal in from the inside using a 16 mm socket, making sure its marked side faces the mechanical seal, and

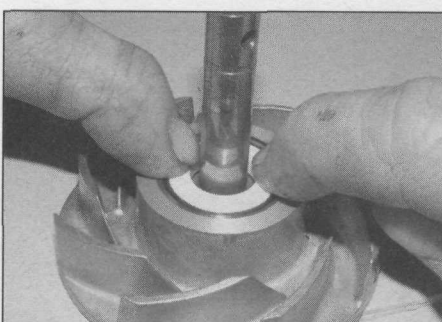
setting it so that it is flush with the rim of its bore – do not set it any deeper into its bore (see illustrations). Drive the bearing in, with its marked side facing out, using a 19 mm socket, until it seats (see illustration).

11 Carefully lever the seal seat and its rubber damper from the hub of the impeller (see illustration). Using a set square, check for any tilt in the impeller shaft as shown (see illustration). If the amount of tilt exceeds the limit specified, replace the impeller with a new one. Coat the rubber damper on the new seal seat with coolant and press it into the impeller hub (see illustration).

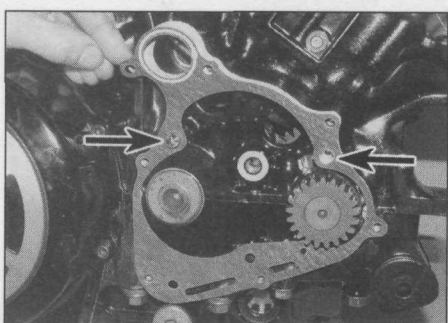
12 Slide the impeller into the housing (see illustration 7.8d), then lay the impeller and housing on the bench and push down on the housing so the impeller compresses the mechanical seal until the groove for the shaft circlip is visible, then fit the circlip, making sure it locates in its groove (see illustration 7.8c). Fit the drive pin into its hole in the shaft, then locate the driven gear over it and secure it with its circlip (see illustrations 7.8b and a).



7.11c Coat the damper on the new seat new with coolant ...



7.11d ... and press it into place



7.14a Fit the dowels (arrowed), then locate a new gasket over them ...



7.14b ... and install the housing

### Installation

13 If the coolant pipe was detached from the housing, apply a smear of grease to the new O-ring and fit it into the groove (see illustration 5.9a). Press the pipe into the housing. Smear the other new O-ring with grease and fit it into the groove in the other end of the pipe.

14 If removed, fit the dowels into the crankcase (see illustration). Install the housing using a new gasket, making sure it locate over the dowels and the pipe locates