# SECTION C

## THE COOLING SYSTEM


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### GENERAL DESCRIPTION

The cooling system is pressurized, and the water circulation is assisted by a pump attached to the front of the engine and driven by a belt from the crankshaft. The water circulates from the base of the radiator and passes around the cylinders and cylinder head, reaching the header tank of the radiator core via the thermostat and the top water hose. From the header tank it passes down the radiator core to the base tank of the radiator. Air is drawn through the radiator by a fan attached to the water pump pulley.

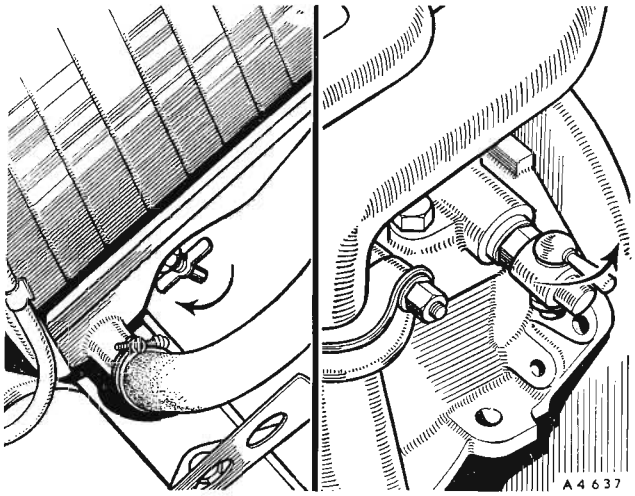



*Fig. C.1*

*(Left) Access to the radiator drain tap is gained from beneath the front of the car. Turn in the direction of the arrow to open the tap*

*(Right) The drain tap for the cylinder block is located on the right-hand side of the block at the rear. Turn in the direction of the arrow to open the tap*

## Section C.1

### LUBRICATION

**Water pump**

Remove the plug from the water pump casing and refill the aperture with lubricant. Do not subject the pump to pressure lubrication, otherwise lubricant will be forced past the bearings onto the face of the carbon sealing ring and will impair its efficiency.

## Section C.2

### RADIATOR FILLER CAP

The cooling system is under appreciable pressure while the engine is hot, and the radiator filler cap must be removed very carefully or left in position until the water has cooled.

If it is necessary to remove the filler cap when the engine is hot it is absolutely essential to remove it gradually, and the filler spout is provided with a specially shaped cam to enable this to be done easily.

Unscrew the cap slowly till the retaining tongues are felt to engage the small lobes on the end of the filler spout cam, and wait until the pressure in the radiator is fully released before finally removing the cap.

It is advisable to protect the hand against escaping steam when removing the cap.

## Section C.3

### DRAINING AND FLUSHING THE SYSTEM

**Draining**

Remove the radiator header tank filler cap.

Open both drain taps, one at the base of the radiator and the other on the rear of the cylinder block.

**NOTE.—If anti-freeze mixture is being used it should be drained into a clean container and carefully preserved for replacement.**

**Flushing**

To ensure efficient circulation of the coolant and to reduce the formation of scale and sediment in the radiator the system should be periodically flushed with clean running water. The water should be allowed to run through until it comes out clear from the drain tap. This service is preferably carried out before adding anti-freeze in the autumn, and again when the anti-freeze is drained off for the summer.

If furring is excessive, remove the radiator as in Section C.5 and flush through in the reverse way to the flow, i.e. turn the radiator upside-down and let the water flow in through the bottom hose connection and out through the top. The use of radiator reverse-flush adaptor 18G 187 with a 1 in. (25·4 mm.) diameter water hose is recommended for this purpose.

**Refilling**

Close the drain taps.

Ensure that the water hose clips are tightened.

Fill the system through the filler in the radiator header tank until the water is up to the level indicator strip.

When possible, use rain-water for filling the system.

Avoid overfilling when anti-freeze is in use to prevent unnecessary loss on expansion.

Screw the filler cap firmly into position.

The cooling system is unsuitable for use with anti-freeze mixtures having an alcohol base owing to the high temperatures attained in the top tank. Only anti-freeze mixtures of the ethylene glycol or glycerine type should be employed.

## Section C.4

### THERMOSTAT

**Removing**

Drain the cooling system (Section C.3). Disconnect the outlet hose from the outlet elbow. Remove the securing nuts and spring washers from the thermostat cover and lift the cover away from its studs. Remove the paper joint washer and lift out the thermostat. Test the thermostat opening temperature by immersing it in water at the temperature given under **'GENERAL DATA.'** If the thermostat valve does not start to open or if the valve sticks in the fully open position, renew the thermostat;

under no circumstances should any attempt be made to repair it.

**Refitting**

Installation of the thermostat assembly is the reverse of the removal procedure. Fit a new paper joint washer if the existing one is damaged.

## Section C.5

### RADIATOR

**Removing**

Drain the cooling system (see Section C.3). Release the hose clip on the thermostat housing and remove the hose from the housing extension. Remove the radiator bottom hose by releasing the clips on the bottom radiator connection. Remove the fresh air induction pipe from its connection on the front cowling. Remove the temperature gauge thermal element from the right-hand side of the radiator. Remove the bolts which secure the radiator to the support brackets and remove the radiator.

**Refitting**

Reverse the removal procedure.

## Section C.6

### FAN BELT

**Adjusting**

To adjust the dynamo and fan belt tension slacken the two dynamo pivot bolts, release the bolt on the slotted adjusting link, and raise the dynamo bodily until the belt tension is correct. Tighten the bolts with the dynamo held in this position. A gentle hand-pull only must be exerted on the dynamo, otherwise the tension will be excessive and undue strain will be thrown on the dynamo bearings.

The belt should be sufficiently tight to prevent slip, yet it must be possible to move it laterally about 1 in. (2·54 cm.) at the centre of its longest run.

**Removing**

Slacken the dynamo pivot and adjusting link bolts. Push the dynamo down, release the belt from the crankshaft pulley, and remove the belt.

## Section C.7

### WATER PUMP

The water pump is of the centrifugal impeller type mounted on a common spindle with the fan and operating in a cast-iron housing mounted on the front of the cylinder block. Water-sealing is effected by a spring-loaded carbon washer bearing upon a seating in the impeller housing. It is necessary to dismantle the pump and fan assembly to obtain access to the sealing gland. Removing, dismantling, and refitting instructions are given in the following paragraphs.

**Removing**

Drain the water from the cooling system and remove the radiator as in Sections C.3 and C.5.

Remove the hose from the water pump inlet connection and slacken the top clip of the thermostat by-pass hose, the dynamo mounting bolts, and the adjusting screw. Withdraw the set screws securing the fan blades to the water pump hub and remove the blades, belt, and pulley.

Unscrew the set screws securing the pump to the cylinder block and remove the pump complete with the by-pass hose.

**Dismantling**

Pull out the bearing locating wire through the holes in the top of the pump body.

Gently tap the spindle rearwards to release the combined spindle and bearing assembly together with the seat and vane.

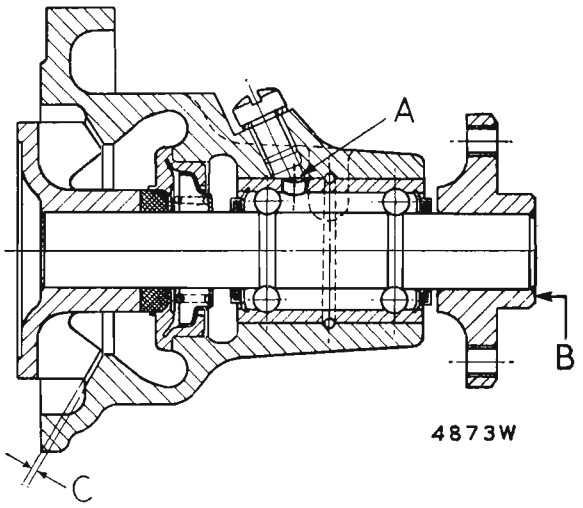



*Fig. C.2*

*A section through the water pump showing the location of the components. When assembled, the hole* (A) *in the bearing must coincide with the lubricating hole in the water pump and the face of the hub* (B) *must be flush with the end of the spindle.* (C) *is a clearance of* ·020 *to* ·030 *in.* (·508 *to* ·762 *mm.*)

Withdraw the vane from the spindle with a suitable extractor and remove the pump seal assembly.

If the bearing shows signs of wear or damage, replace it by a new bearing and spindle assembly; bearings alone are not serviced. Renew the seal assembly if wear or damage is apparent or if the pump is leaking.

**Reassembling**

Reassembly is a reversal of the dismantling procedure. Make certain that the hole in the bearing is lined up with the lubricating hole in the pump body before pressing the bearing and spindle into position.

Should the interference fit of the fan hub have been

impaired when the hub was withdrawn from the spindle, a new hub must be fitted.

**Refitting**

Reverse the removal procedure when refitting.

## Section C.8

### TEMPERATURE GAUGE

A temperature gauge unit, consisting of a thermal element and dial indicator, is fitted to the vehicle. The thermal element is held in the radiator header tank by a gland nut. The dial indicator is situated in the instrument panel and is connected to the element by a capillary tube filled with mercury.

Damage to any of the above-mentioned parts will necessitate the renewal of the complete temperature gauge unit.

The combined water temperature and oil pressure gauges are of integral construction, and should one of these instruments fail, both will have to be renewed.

## Section C.9

### FROST PRECAUTION

Water, when it freezes, expands, and if precautions are not taken there is considerable risk of bursting the radiator, cylinder block, or heater (where fitted). Such damage may be avoided by draining the cooling system when the vehicle is left for any length of time in frosty weather, or by adding anti-freeze to the water.

As the cooling system of the vehicle is pressurized relatively high temperatures are developed in the radiator upper tank. For this reason anti-freeze solutions having an alcohol base are unsuitable owing to their high evaporation rate producing rapid loss of coolant and a consequent interruption of the circulation of coolant.

Only anti-freeze of the ethylene glycol or glycerine type is suitable for use in the cooling system. We recommend owners to use Bluecol Anti-freeze (non-corrosive) in order to protect the cooling system during frosty weather and reduce corrosion to a minimum. We also approve the use of any anti-freeze which conforms to Specification B.S.3151 or B.S.3152.

Before adding anti-freeze mixture to the radiator it is advisable to clean out the cooling system thoroughly by swilling out the passages with a hose inserted in the filler cap while keeping the drain taps open.

Anti-freeze can remain in the cooling system for two years provided that the specific gravity of the coolant is checked periodically and anti-freeze added as required. Specialized equipment is necessary to check the specific gravity, which can be obtained from the anti-freeze manufacturer.

After the second winter, drain the system and flush out. Refill with fresh water or the recommended anti-freeze solution.

Only top up when the cooling system is at its normal running temperature, in order to avoid losing anti-freeze due to expansion.

Make sure that the cooling system is water-tight, examine all joints, and replace any defective rubber hose with new.

The correct quantities of anti-freeze for different degrees of frost resistance are given in the table below.

| *Absolute safe limit* | | *Commences freezing at* | | *Solution* (%) | *Quantity of anti-freeze required* |
|---|---|---|---|---|---|
| ° *C.* | ° *F.* | ° *C.* | ° *F.* | | |
| −19 | −3 | −9 | 16 | 20 | 2 pts. (2·4 U.S. pts., 1·1 litres) |
| −26 | −15 | −13 | 9 | 25 | 2½ pts. (3·0 U.S. pts., 1·42 litres) |
| −33 | −28 | −16 | 3 | 30 | 3 pts. (3·6 U.S. pts., 1·71 litres) |

**Warning**

**When a heater unit is fitted an anti-freeze solution must be used in the cooling system since no provision is made for draining the heater.**