SECTION C

THE COOLING SYSTEM

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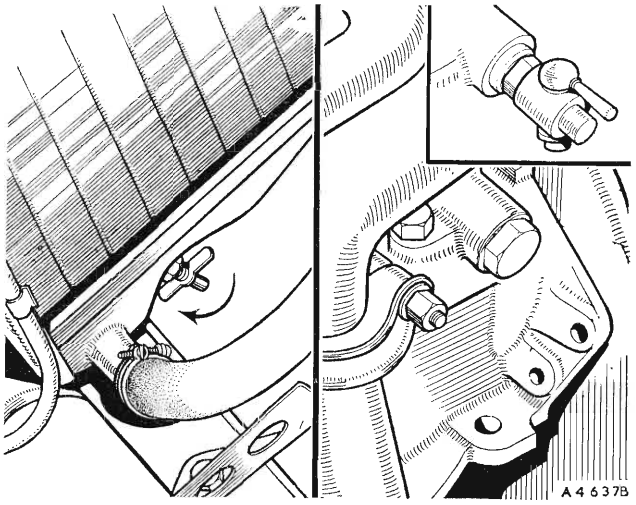


Fig. C.1

(Left) Access to the radiator drain tap is gained from beneath the front of the car. (Early cars only)

(Right) The drain tap or plug (later models) for the cylinder block is located on the right-hand side of the block at the rear

Section C.1

LUBRICATION

Early cars

Remove the plug from the water pump body and add a small quantity of one of the recommended greases. Do not pressure lubricate the water pump, or the seal may be damaged.

Later cars

The greasing plug has been deleted from the water pump as no lubrication is required.

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

Early cars

Draining

Remove the radiator header tank filler cap.

Open both drain points (see Fig. C.1) and the heater tap.

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 points but leave the heater tap open.

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.

Check that the heater unit is completely full by disconnecting the heater outlet pipe.

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.

Later cars

Draining

(1) Remove the radiator filler plug.

(2) Remove drain plug from the radiator return pipe. To drain the cooling system on cars not fitted with drain taps or plugs, slacken the hose clip and remove the bottom hose at its connection to the radiator.

(3) Remove cylinder block drain plug.

Flushing

(4) Carry out operations (1) to (3).

(5) Insert a hose pipe into the radiator filler plug orifice and allow water to pass through the system until clean water flows from both drain points.

Filling

(6) Refit both drain plugs.

(7) Open the heater water valve.

(8) Fill the system through the radiator filler orifice and fit the filler plug.

(9) Top up the expansion tank to the half-full point and refit the expansion tank cap.
(10) Run the engine at a fast idle speed for approximately 30 seconds.
(11) Stop the engine and top up the system through the radiator filler.
(12) Refit the filler plug and run the engine until normal operating temperature is reached.
(13) Stop the engine and allow the system to cool.
(14) When the system has cooled, remove the expansion tank cap, and top up the tank to the half-full point.
(15) Refit the expansion tank cap.

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.

Examine the thermostat for damage and check that the valve is in the closed position. If the thermostat is damaged or the valve is in the open position, renew the thermostat.

To test the thermostat, immerse it in water heated to the temperature marked on the thermostat, the valve will open if the thermostat is functioning correctly. If the valve fails to open renew the thermostat.

IMPORTANT. In warm climates where the thermostat is removed as a permanent measure, it is essential that a thermostat blanking sleeve is fitted. Failure to fit a sleeve will result in higher operating temperatures and possible damage.

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 AND EXPANSION TANK

Radiator—early cars

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.

Radiator—later cars

Removing

(1) Drain the cooling system (Section C.3).
(2) Remove the radiator grille (Section R.3).
(3) Disconnect the top, bottom, and expansion hoses from the radiator connections.
(4) Remove the two nuts and screws securing the top radiator cowl plate to the body.
(5) Slacken the two nuts and screws securing the bottom radiator cowl plate to the body.
(6) Remove the four radiator side securing bolts.
(7) Lift out the radiator complete with cowl.
(8) Disconnect the return hose from the cylinder block.
(9) Remove the two bolts securing the radiator bottom return pipe and remove the pipe complete with hoses.

Refitting

(10) Reverse the removing procedure then refill the cooling system.

Expansion tank

Removing

(1) Remove the filler cap.
(2) Disconnect the spill hose from the radiator connection.
(3) Unscrew the tank mounting screws and remove the expansion tank complete with spill hose.

Refitting

(4) Reverse the removing procedure in (2) and (3), half fill the tank with coolant and refit the filler cap.

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

Removing

(1) Remove the radiator (Section C.5).
(2) Remove the fan retaining screws and withdraw the fan.
(3) Slacken the air pump mounting screws and remove the pump drive belt.
(4) Remove the air pump adjusting link bolt, raise the air pump as high as the hoses will allow, then tighten the mounting bolts to retain the pump.
(5) Slacken the dynamo mounting bolts and remove the fan belt.
(6) Remove the two dynamo top mounting bolts and swing the dynamo down so that it rests on the wing valance.
(7) Disconnect the by-pass hose from the water pump.
(8) Disconnect the radiator bottom hose from the water pump and heater tube.
(9) Remove the four water pump retaining screws and withdraw the pump from the cylinder block.

Dismantling

(10) Withdraw the bearing locating wire.
(11) Pull the fan hub from the pump spindle.
(12) Tap the spindle rearwards to remove the spindle and bearing assembly from the pump.
(13) Pull the impeller from the spindle and then remove the seal.

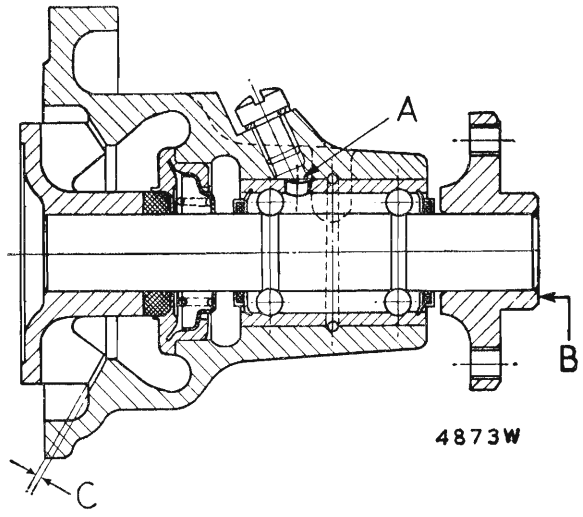
Inspection

(14) Check the bearing and spindle for signs of wear and damage, the complete assembly must be renewed if worn or damaged.
(15) Renew the seal if the pump was leaking or if the seal shows signs of wear or damage.
(16) Check that the fan hub has retained its interference fit to the spindle, renew the hub if the correct fit has been lost.

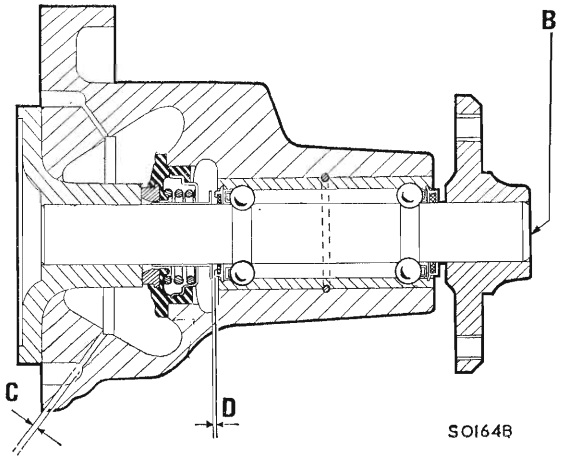
Reassembling (Fig. C.2).

(17) Check the fit of the hub to the spindle, and renew the hub if necessary. The hub must be fitted with its face flush with the end of the spindle B.
(18) Press the spindle bearing assembly into the case and take measurement E; adjust the position of the spindle bearing assembly to obtain the correct measurement.
  (*a*) On pumps fitted with the early-type seal and thrower check the bearing to thrower clearance D, before fitting the spindle.
  (*b*) On pumps fitted with a greaser plug, align the holes in the bearing and body A.
(19) Fit a new seal, lubricate the seal with a mineral-based oil immediately prior to assembly.
(20) Press the impeller onto the spindle, ensuring that the correct running clearance C is maintained between the impeller vanes and the pump body.

1



2



3

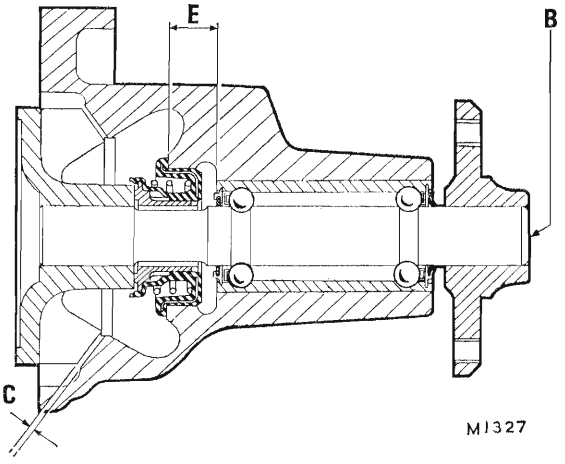


Fig. C.2

Section through the water pumps

1. With grease plug. **2. Sealed type.**
3. Sealed type, bearing thrower deleted, pressure-balanced seal.

A. Bearing lubricating hole.
B. Hub face flush with spindle.
C. ·020 to ·030 in. (·51 to ·76 mm.) clearance.
D. ·042 to ·062 in. (1·1 to 1·6 mm.) clearance.
E. Distance from rear face of spindle bearing (outer track) to seal housing shoulder should be ·534 in. (13·56 mm.).

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 PRECAUTIONS

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 above.

No provision is made for draining the heater or expansion tank and it is therefore essential that the cooling system is filled with an anti-freeze solution when the vehicle is operating in freezing conditions.

Refer below for the percentage of approved anti-freeze necessary for the required protection.

After adding the required amount of anti-freeze to the system, add a ¼ pint of neat anti-freeze to the coolant in the expansion tank.

Anti-freeze	*Commences to freeze*		*Frozen solid*		*Amounts of anti-freeze*					
					Pts.		*U.S. Pts.*		*Litres*	
%	° *C.*	° *F.*	° *C.*	° *F.*	*Mk. I & II*	*Mk. III*	*Mk. I & II*	*Mk. III*	*Mk. I & II*	*Mk. III*
25	−13	9	−26	−15	2¾	1½	3	2	1·5	·85
33⅓	−19	−2	−36	−33	3½	2	4	2½	2	1·15
50	−36	−33	−48	−53	5½	3	6	3½	3	1·17