SECTION C

THE COOLING SYSTEM

THE COOLING SYSTEM

DESCRIPTION Fig. C1.

The cooling system is pressurized and thermostatically controlled. It consists of the following components:-

(i) A cross flow radiator.

(ii) A filler tank and pressurized filler cap.

(iii) A four bladed fan assembly.

(iv) A cylinder block connection pipe assembly which accommodates the spiral type impeller pump in its R.H. side.

(v) A cylinder head connection pipe assembly which accommodates the thermostat unit in its L.H. side.

(vi) Small bore pipes which connect the thermostat housing with the carburettor mounting on the inlet manifold and the latter with the coolant pump inlet port.

All these components are connected by rubber and canvas flexible hoses and secured with hose clips.

The coolant is pumped into the cylinder block where it flows around the walls of the cylinders and through matching holes in the cylinder head, into the cylinder connection pipe and thermostat housing. When the engine unit is started from cold the thermostat unit will be closed and the coolant will bypass the radiator through the carburettor mounting on the centre of the inlet manifold to the coolant pipe intake port. However, when the engine unit reaches its normal working temperature the thermostat unit will open and allow the coolant to pass into the top L.H. side of the crossflow radiator block. It will flow down the radiator header tank, across through the downward inclined tubes to the bottom tank at the R.H. side of the radiator block, to pump into the cylinder block by the coolant pump mounted in the R.H. side of the cylinder block connection pipe. During the opening of the thermostat unit there is no closing of the by-pass pipe and so heat from the engine will be transferred to the carburettor mounting keeping it at a constant temperature.

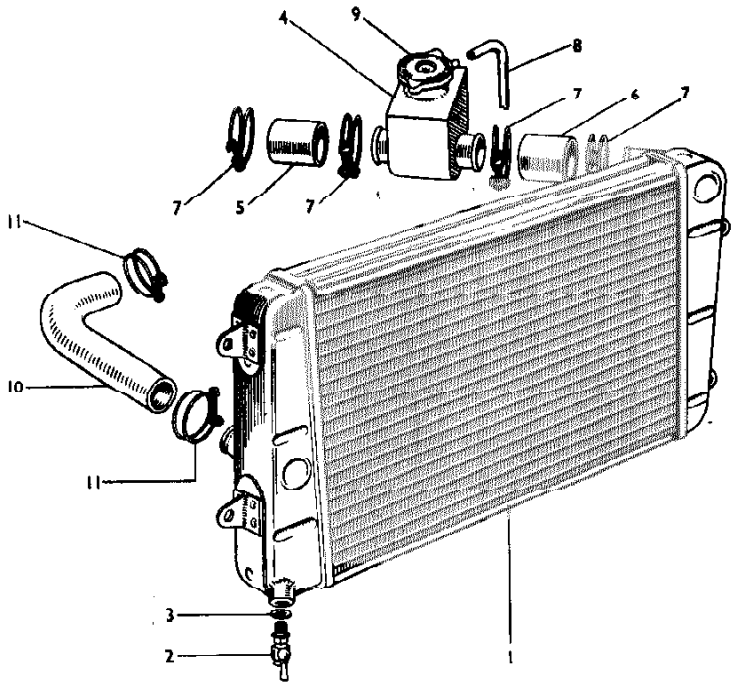


Figure C1. Exploded View of Radiator Block and Associated Components.

1. Radiator Block.
2. Radiator Drain Tap.
3. Copper Washer.
4. Filler Tank.
5. Long Hose.
6. Short Hose.
7. Hose Clips.
8. Overflow Pipe.
9. Radiator Filler Cap.
0. Bottom Radiator Hose.
1. Hose Clip.

THE RADIATOR BLOCK

DESCRIPTION

The radiator block is of the finned tube crossflow type having the header tank on the L.H. side and the bottom tank on the R.H. side and the rows of tubes are set at an incline from the L. to

R.H. side. The radiator is attached to the body of the car by a bracket protruding from each of the side tanks and a drain plug is fitted in the bottom R.H. front corner.

DRAINING AND FILLING THE RADIATOR BLOCK Fig. C2.

1. DRAINING

Remove the radiator filler cap from the header tank and open the tap in the bottom R.H. corner of the radiator.

2. FILLING

The filling of the radiator is the reversal of the draining sequence but particular attention must be given to the following points.

(i) That the radiator is filled slowly to obviate the possibility of airlocks forming in the cooling system behind the thermostat.

(ii) That the radiator is filled until the level of the coolant is observed to be 1.500" (38.100 m/m) below the level of the filler neck.

(iii) That the engine is started and run for a time and so clear any airlocks in the cylinder block or heads; then top up the radiator and fit the radiator cap.

DRAINING THE CYLINDER BLOCK

1. DRAINING

Drain the radiator as detailed above and remove the bolts in the two side faces of the cylinder block adjacent to the gearbox mounting plate.

2. FILLING

Ensure that the bolt sealing washers are in good class condition and replace the two bolts.

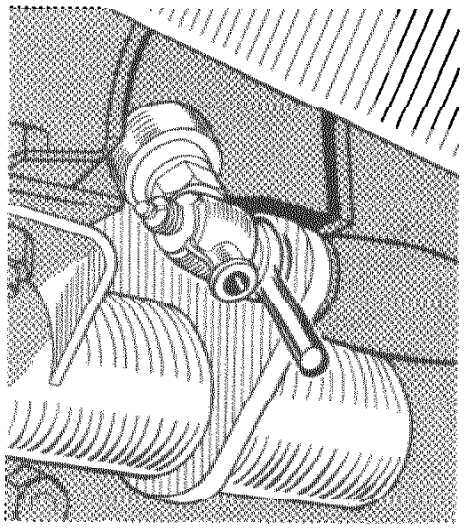


Figure C2. Location of Radiator Drain Tap.

REMOVAL AND REPLACEMENT RADIATOR DRAIN TAP

1. REMOVAL

Drain the radiator as detailed above. Withdraw the drain plug from the bottom R.H. corner of the radiator by unscrewing.

2. REPLACEMENT

The replacement of the radiator drain tap is the reversal of the removal sequence but particular attention must be given to the following points:-

(i) That the sealing washer is in good condition.

(ii) That the position of the drain tap is set by the addition of more or thinner sealing washers.

THE COOLANT LEVEL

COOLING SYSTEM CAPACITY: 23	IMPERIAL PINTS.
26½	AMERICAN PINTS.
12.496	LITRES.

BELOW FILLER NECK (COLD) 1.500" (38.100 m/m)

As the cooling system is pressurized, the coolant will expand with heating to a point just below the filler neck and when the system is cold the coolant level will fall to that specified above. No useful purpose is served by filling the system above this level.

FLUSHING THE SYSTEM

1. THE RADIATOR

To obtain the best results the flow is reversed and a compressed air line connected to the flow of water from bottom of the block to the top.

Remove the radiator from the engine compartment as detailed below. Connect the air and water supply to the radiator pipe approximately half way down its R.H. side and two overflow pipes, one in its radiator pipe in its R.H. corner and the second to the drain tap. Turn on the water supply slowly and the air line intermittantly to produce a surging effect. Continue the flow of water until the draining water is clean.

Replace the radiator to the front of the engine compartment by the reversal of the foregoing procedure.

2. THE ENGINE UNIT

The flushing of the engine unit will be effected at the same time as the radiator flushing but the flow of air and water will be from the top of the engine to the bottom.

Remove the thermostat unit and coolant pump as detailed on pages C5 and C7. Replace the thermostat cover and attach the hose of the ingoing air and water. Position a funnel with a drain hose attached to a position below the water pump housing suitably shielded to catch any splashing water. Turn on the water supply slowly and the air line intermittantly to produce a surging effect. Continue the flow of water and air until the draining water is clean.

Replace the components by reversing their removal sequence.

3. AFTER THE USE OF A DESCALING AGENT

Detach the filler tank from between the thermostat housing and the radiator block as detailed on page C4. Remove the thermostat unit from the cylinder head connection pipe as detailed on page C5 and then replace the thermostat cover. Connect a water feed hose to the thermostat cover and a drain pipe to the top of the radiator. Turn on the water and allow it to flow through the complete unit continuing the flow until the discharged water is clear or 15 minutes which ever is the shorter.

Replace the component by reversing their removal sequence.

DESCALING AGENTS

If after a prolonged period of service it is desirous to descale the cooling system, care must be exercised in its choice and use to ensure that the aluminium components are not damaged as some agents have a corrosive nature.

The use of washing soda is most suitable. Drain the cooling system as detailed on page C2, ensure all connections are secure. Dissolve $2\frac{1}{2}$ lb. (1.134 kgs.) of household washing soda (sodium carbonate) in two imperial gallons ($2\frac{1}{2}$ American gallons) (9.1 Litres) of water and pour into the radiator as detailed on page C2 top up the system as necessary and use the car for no more than four hours, drain and flush as detailed above, and then fill as detailed on page C2.

REMOVAL AND REPLACEMENT

THE RADIATOR

1. REMOVAL

Drain the radiator as detailed on page C2. Detach the inlet and outlet hoses from the two radiator pipes by slackening the hose clips. Remove the radiator from the front of the engine block by withdrawing two bolts at each side.

2. REPLACEMENT

The radiator is fitted to the front of the engine compartment by the reversal of the removal sequence.

THE FILLER TANK AND OVERFLOW PIPE

DESCRIPTION Fig. C.3.

The filler tank is situated between the thermostat housing and radiator inlet port connected to both by two short lengths of flexible hose. Incorporated in the top side of the filler tank is the neck for the radiator filler cap and the overflow outlet port and a rubber pipe attached thereto at the side of the body by two clips allows the overflow coolant pressure to escape. The tank also acts as an expansion chamber having space between the underside of the filler neck and the level of the coolant.

Care must be exercised when removing the radiator filler cap from a hot system, as escaping vapour may scald the fingers. The radiator filler cap must not be removed while the system is hot and the engine running.

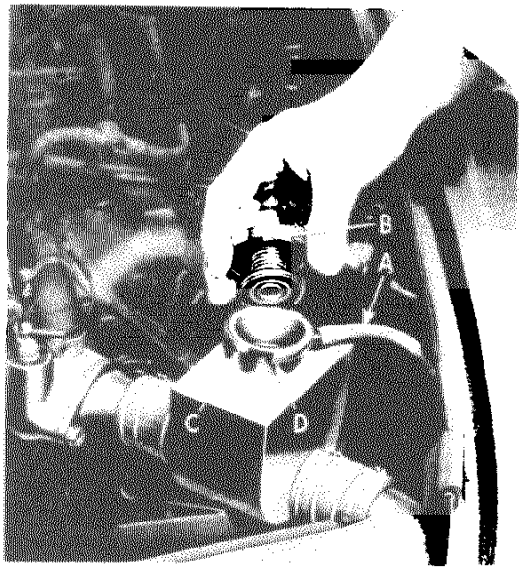


Figure C3. The Filler Tank Showing Overflow Pipe and Radiator Filler Cap being Removed.

A. Overflow Pipe.
B. Securing Lug.
C. Partial Removal Stop.
D. End of Travel Stop.

REMOVAL AND REPLACEMENT
THE FILLER TANK

1. REMOVAL

Drain the radiator as detailed on page C2 slacken the four hose clips of the two flexible hoses and detach the overflow pipe. Ease the two hoses as close to the thermostat housing and radiator respectively and remove the filler tank.

2. REPLACEMENT

The replacement of the filler tank is the reversal of the removal sequence.

THE RADIATOR FILLER CAP

DESCRIPTION Fig. C4.

The radiator filler cap fitted to the top of the filler tank is the pressure type, it incorporates a sprung rubber faced plate which makes contact with the bottom of the filler neck and completely seals it. The spring will allow a pressure of 7 p.s.i. to build up in the cooling system and over this pressure it will open and allow the excess pressure to escape through the overflow pipe connected to the filler neck. A small relief valve is built into the rubber faced plate of the radiator cap which will admit atmospheric pressure as the system cools down. The use of this type of radiator filler cap permits a wider running temperature range by raising the boiled temperature and seals the cooling system against the loss of coolant due to evaporation.

REMOVAL AND REPLACEMENT
THE RADIATOR FILLER CAP Fig. C4.

1. COLD OR WARM SYSTEM

Remove the radiator cap from the top of the header tank by turning it anti-clockwise to a stop, press the cap downward, turn further anti-clockwise and lift off.

2. HOT SYSTEM

Remove the radiator cap from the top of the header tank by turning it anti-clockwise to a stop and pause for a few moments to allow the excess pressure to escape through the over flow pipe. Press the cap downward, turn further anti-clockwise and lift off.

3. REPLACEMENT

Fit the radiator cap by placing it on the filler neck, pressing it downward and turning it clockwise.

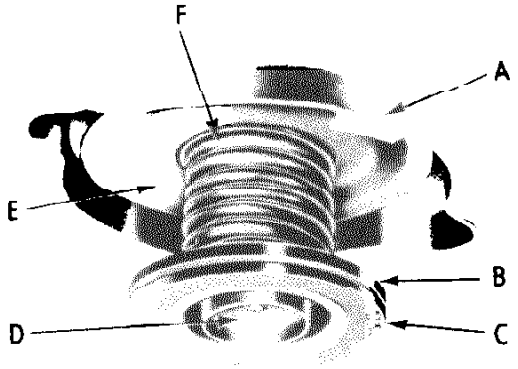


Figure C4. View of Radiator Filler Cap Removed from Neck.

A. Securing Lug.
B. Valve Plate.
C. Valve Seal.
D. Relief Valve.
E. Spring Plate.
F. Valve Spring.

THE RADIATOR FILLER CAP
PRESSURES

RADIATOR CAP. RELEASE PRESSURE.	7 p.s.i.
RADIATOR CAP. RELIEF PRESSURE.	1-2 p.s.i.

THE THERMOSTAT

DESCRIPTION Fig. C5.

A bellow type thermostat is used and fitted in the L.H. side of the pipe assembly connecting the two cylinder heads. It controls the flow of coolant while the engine is warming up to its normal working temperature.

When the engine is started from cold the thermostat is closed and coolant from the two cylinder heads will be directed through a by-pass system to the carburettor mountings to the coolant pump body and then into the lower regions of the cylinder block by the action of the coolant pump. As the engine and coolant temperatures rise so the thermostat will open allowing the coolant to pass into the radiator until the engine reaches its normal working temperature when it will be completely open. Should conditions prevail, that the radiator over cools and so delivers coolant at a temperature lower than usual it will be realised that the heat of the engine will be reduced too much and so the thermostat will close slightly and so reduce the flow to the radiator causing the coolant pump to draw more through the by-pass pipes and so the temperature will be balanced.

To obviate the possibility of an air lock forming between the engine unit and the thermostat unit during radiator filling operations a small bleed hole is incorporated in the thermostat valve and this must be unobstructed.

REMOVAL AND REPLACEMENT
THE THERMOSTAT UNIT Figs. C5 and C9.

1. REMOVAL

Drain the cooling system as detailed on page C2. Slacken the hose clips on the filler tank hose and withdraw the two bolts of the thermostat housing cover. Move the thermostat housing cover and withdraw the thermostat.

2. REPLACEMENT

The replacement of the thermostat unit is the reversal of the removal sequence but particular attention must be given to the following point:

That the bleed holes in the top of the thermostat valve are unobstructed.

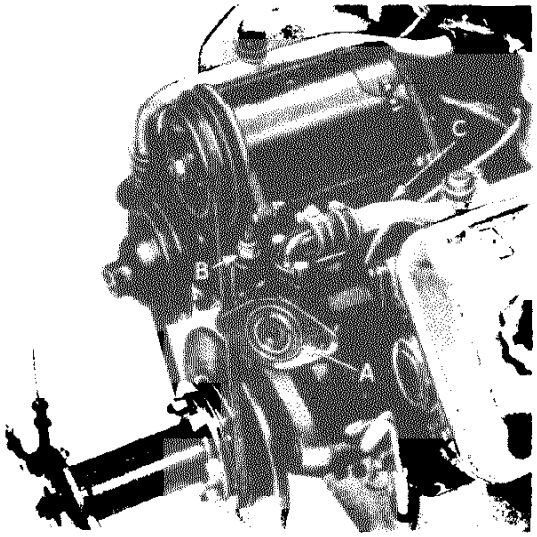


Figure C5. Thermostat Unit in Housing, Location of Engine Temperature Transmitter Unit and By-Pass Pipe to Carburettor Mounting.

A. Thermostat Bled Hole.
B. Engine Temperature Transmitter Unit.
C. By-Pass Pipe to Carburettor Mounting.

TESTING THE THERMOSTAT UNIT

Remove the thermostat housing as detailed on page C5. Examine the thermostat unit for signs of damage or if the valve fails to close discard the unit. When no damage is observed place the thermostat unit in a vessel of water and heat, observing the thermostat unit to ensure it fully opens, remove the vessel from the heat and observe the unit as it closes. By placing a thermometer alongside, the opening and closing temperatures can be noted.

When "bind" marks are observed on the shank on the valve they can be relieved by the judicious use of a Swiss file. Ensure that the small bleed hole in the valve is unobstructed.

The thermostat unit is replaced to its housing and the other components by the reversal of the removal sequence.

THERMOSTAT TEMPERATURES

Thermostat unit starts to open.	$167^{\circ}F$ - $176^{\circ}F$. ($76^{\circ}C$ - $80^{\circ}C$)
Thermostat unit fully open	$195^{\circ}F$. ($90.6^{\circ}C$)

The above temperatures are when the barometer reading is 29" mercury.

THE ENGINE TEMPERATURE GAUGE

DESCRIPTION Fig. C5.

The engine temperature gauge is a two piece instrument, consisting of a transmitter unit fitted on the engine side of the thermostat unit and connected by a single wire to the indicator unit in the centre instrument panel of the cockpit.

REMOVAL AND REPLACEMENT
ENGINE TEMPERATURE GAUGE
TRANSMITTER UNIT Fig. C5.

1. REMOVAL

Drain the radiator as detailed on page C2. Detach the earthing lead from the battery and remove the electrical lead from the terminal at the top of the engine temperature gauge transmitter unit. Withdraw the transmitter unit from the thermostat housing by unscrewing.

2. REPLACEMENT

The replacement of the transmitter unit is the reversal of the removal sequence.

TO TEST
THE ENGINE TEMPERATURE
TRANSMITTER UNIT

Having tested the indicator in the cockpit and found it serviceable remove the engine temperature transmitter unit as detailed on page C6.

Utilizing an independent piece of electrical cable connect the transmitter unit terminal to the "T" terminal of the indicator unit and connect the body of the transmitter unit to earth. Re-connect the battery and switch on the ignition apply heat to the transmitter unit when the indicator unit should move toward "N" and "H". When this condition is apparent a dis-connection in the car cable from indicator to transmitter units can be suspected. When no reading is observed the transmitter unit is unserviceable and a replacement fitted.

THE FLEXIBLE HOSES

DESCRIPTION. Fig. C9.

The flexible hoses are of a rubber and canvas construction and are used not only to form a passage for the coolant but to isolate engine movements from the radiator.

A right angle shaped hose connects the outlet port of the radiator to the coolant pump, two short straight hoses connect the thermostat outlet, filler tank and radiator inlet port and small diameter hose connect the rigid by-pass pipes to the inlet manifold coolant pump and thermostat housing. The flexible hoses are connected to their respective components by screw type hose clips.

Before filling the cooling system with coolant containing an anti-freeze additive ensure that all the flexible hoses are in first class condition and that all hose clips are tight.

REMOVAL AND REPLACEMENT
FLEXIBLE HOSES

1. REMOVAL

Slacken off the hose clip at each end by using a screw driver, give the flexible hose a twist to break the seal between it and its component and remove by manipulation.

2. REPLACEMENT

The replacement of the flexible hose is the reversal of the removal sequence but particular attention must be given to the following point.

(i) That the fitting of the flexible hose will be facilitated by smearing it internally with soft soap or even dampening it with water.

(ii) That the hose clips are located behind the beaded edge of the component to which the flexible hose is being attached.

THE COOLANT PUMP

DESCRIPTION Figs. C6. and C9.

The coolant pump is of the centrifugal type having a four bladed spiral type impeller, a sealed type bearing with a carbon and rubber seal interposed between, and is driven by a vee belt from the front end of the crankshaft. The coolant inlet is at the R.H. side of the bearing housing between the bearing and the small end of the propellor; the spiral shaped impeller draws the coolant through and passes it into both sides of the pipe assembly on which it is mounted into the cylinder block to cool both banks of cylinder bores. The coolant pump bearing assembly is packed with grease during assembly and a lubrication operation is unnecessary.

The withdrawal of the impeller from the rear end of the coolant pump shaft destroys part of its interference fit, when this component is being re-used it is a wise plan to run a small amount of solder around their fitting ends after the impeller has been pressed onto the dimension specified and so effect a good seal.

REMOVAL AND REPLACEMENT
COOLANT PUMP

1. REMOVAL

Drain the cylinder block and remove the vee belt as detailed on page C2 and C10

respectively. Remove the radiator bottom and by-pass hoses from the coolant pump inlet by slackening the hose clips. Detach the coolant pump from the R.H. side of the cylinder block pipe assembly by withdrawing five bolts.

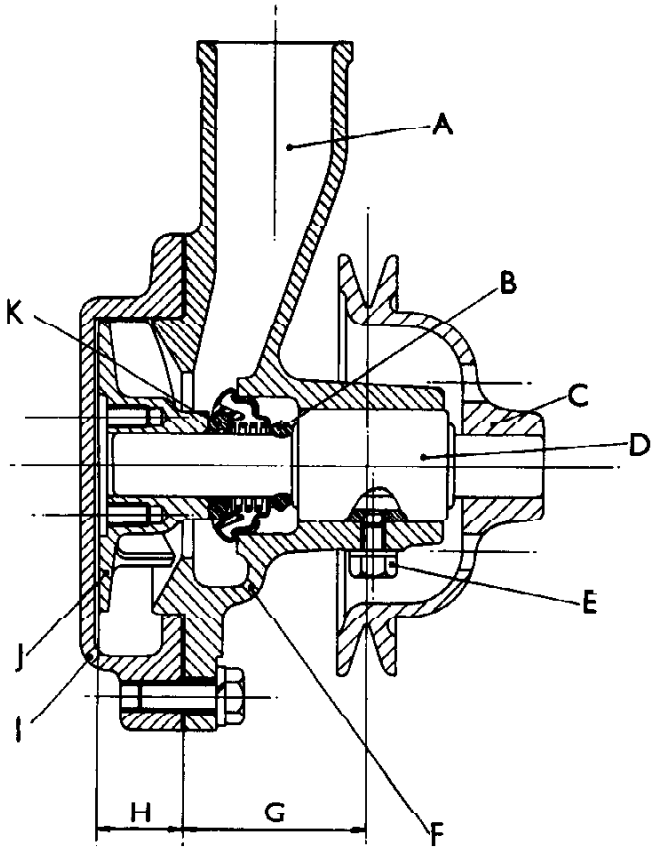


Figure C6. Cross Section of Coolant Pump.

A. Coolant Intake from Bottom of Radiator Block
B. Thrower Ring.
C. Belt Drive Pulley
D. Bearing and Shaft Assembly.
E. Bearing Locating Bolt.
F. Bearing Housing.
G. Dimension between Coolant Pump Fitting Face and Centre of Belt Drive.
H. Dimension between Coolant Pump Fitting Face and Flat Face of Impeller.
I. Cylinder Block Connection Pipe.
J. Coolant Pump Impeller.
K. Carbon Face of Rubber and Spring Seal Assembly.

2. REPLACEMENT

The replacement of the coolant pump is the reversal of the removal sequence.

DISMANTLING AND ASSEMBLING
COOLANT PUMP Figs. C6. and C9.

1. DISMANTLING

Withdraw the vee belt pulley and coolant impeller from the front and rear ends of the shaft utilising a suitable extractor. Remove the carbon and rubber seal followed by the thrower ring from inside the bearing housing. Withdraw the bearing locating screw from the top side of the bearing housing and eject the bearing and shaft as an assembly.

2. ASSEMBLING

The assembling of the coolant pump is the reversal of the dismantling sequence but particular attention must be given to the following points:-

(i) That the bearing and shaft assembly is pressed into the bearing housing with the longer end of the shaft first and the locating hole in the side of the bearing aligns with that in the bearing housing.

(ii) That the carbon and rubber seal are pressed into the recess in the rear face of the bearing housing and followed by the impeller, van side first, pressed on to the dimension specified.

(iii) That a small amount of solder is run around the shaft and the rear face of the impeller when the latter is being used for a second time.

(iv) That the vee belt pulley is pressed on until its front face is flush with the end of the shaft.

DIMENSIONS

	ENGLISH	METRIC
Bore in vee belt pulley.	0.6250" 0.6245"	15.875 mm. 15.8623 mm.
Diameter of bearing shaft.	0.6267" 0.6262"	15.9182 mm. 15.9055 mm.
Bore in impeller.	0.6250" 0.6245"	15.875 mm. 15.8623 mm.
Dimension between rear face of impeller and fitting face of coolant pump bearing housing.	0.885"	22.479 mm.
Dimension between fitting face of coolant pump bearing housing and centre line of vee belt pulley.	1.875"	47.625 mm.

THE FAN AND EXTENSION TUBE ASSEMBLY.

DESCRIPTION

A four bladed cooling fan assembly of rivetted construction is resiliently mounted on an extension tube to the front end of the crankshaft. The cooling fan and extension tube are a balanced unit to ± 1 dram on a 3" radius by trimming the outside diameter of the heavy fan blades.

REMOVAL AND REPLACEMENT OF FAN AND EXTENSION TUBE ASSEMBLY Fig. C7.

1. REMOVAL

Detach the suspension pillar bracing member from the two front faces of the front suspension pillar as detailed in THE CHASSIS FRAME SECTION P.

Remove the fan and extension tube assembly from the front face of the crankshaft pulley by removing six nuts and replace one or more nuts to retain the other components mounted on the front face of the crankshaft in their relative positions and so preserve the T.D.C. and ignition indicating marks.

2. REPLACEMENT

The replacement of the fan and extension tube is the reversal of the fitting sequence but the particular attention must be given to the following point:

That if, during the removal operation the crankshaft bolts have been removed the position of the crankshaft damper must be checked as detailed in THE ENGINE UNIT, SECTION D.

DISMANTLING AND ASSEMBLING COOLING FAN AND EXTENSION TUBE Fig. C7.

1. DISMANTLING

Identify the position of the fan assembly relative to the extension tube. Remove the fan assembly from the extension tube by removing the four nuts and bolts, washers, rubber bushes and distance pieces.

2. ASSEMBLING

The assembling of the fan assembly and extension tube is the reversal of the removal sequence but particular attention must be given to the following points:-

(i) That the rubber bushes are fitted to the bores in the fan assembly with their flanges to the outside and with the distance pieces through their centre.

(ii) That the fan and rubber bush assembly is replaced to the front face of the

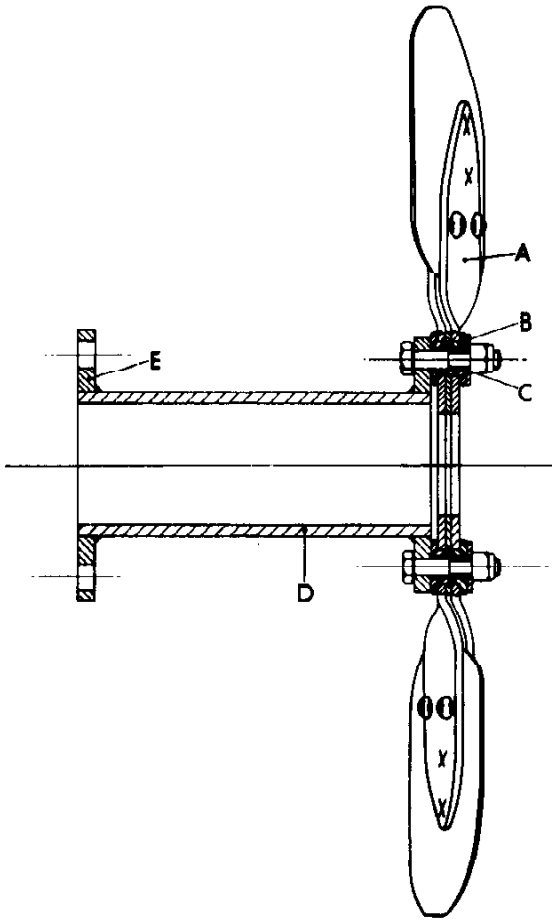
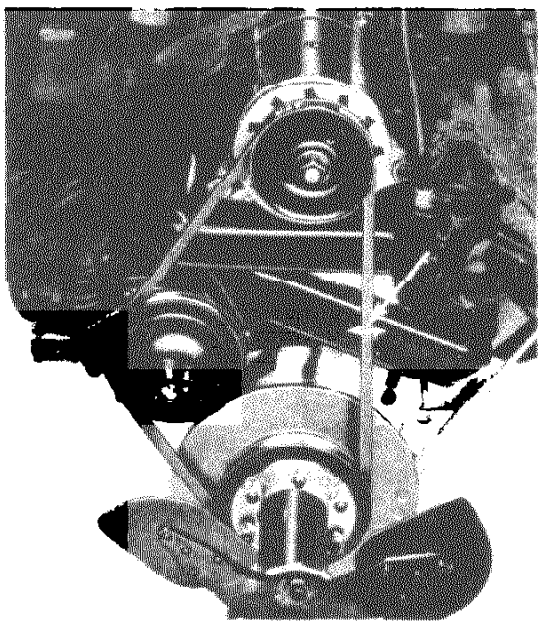


Figure C7. Cross Section of Fan and Extension Tube Assembly.

A. Four Bladed Fan Assembly.
B. Rubber Bushes.
C. Distance Piece.
D. Extension Tube.
E. Crankshaft Pulley Mounting Flange.

extension tube and the four bolts fed in from the rear, a flat washer and nyloc nut are fitted to the front protruding ends and "nipped up" so that the distance pieces are gripped between the extension piece and flat washers.



TO ADJUST VEE BELT TENSION Fig. C8

SLACKNESS IN THE L.H. RUN
0.5" (12.7 mm)

Slacken the two L.H. dynamo mounting bolts then slacken the single R.H. dynamo mounting bolt and raise or lower the dynamo unit to tighten or slacken the vee belt tension. Tighten the single bolt when the adjustment is to that specified and finally tighten the remaining two bolts. To remove vee belt, lower dynamo unit and slide belt off dynamo pulley.

Figure C8. (Left)
Adjusting Vee Belt Tension.
0.5" (12.7 mm) slackness at arrow markings.

THE CYLINDER HEAD CONNECTION PIPE

DESCRIPTION Fig. C9.

The cylinder head connection pipe connects the coolant outlet ports in the front faces of the two cylinder heads together with the thermostat housing incorporated in its R.H. side. Situated on top of the pipe assembly is the tapping for the engine temperature transmitter bulb and the by-pass port both of which are on the thermostat unit fitted in the front face. A cover is fitted over the thermostat unit which forms the outlet port of the cylinder head pipe and the radiator.

Its removal can be effected with or without the engine temperature transmitter bulb and thermostat in situ by following the removal sequence but disconnecting the filler tank hose from the thermostat unit cover/outlet.

REMOVAL AND REPLACEMENT

THE CYLINDER HEAD CONNECTION PIPE

1. REMOVAL

Remove the engine temperature transmitter bulb, by-pass pipe, thermostat unit and vee belt as detailed on pages C6 , and C9 respectively. Detach the cylinder head connection pipe from the front face of the two cylinder blocks by withdrawing two bolts at each side.

2. REPLACEMENT

The replacement of the cylinder head connection pipe is the reversal of the removal sequence.

THE CYLINDER BLOCK CONNECTION PIPE

DESCRIPTION Fig. C9.

The cylinder block connection pipe connects the two coolant inlet ports in the front face of the cylinder block with the coolant pump housing incorporated in its front L.H. face. Coolant passes due to the action of the pump, through this pipe assembly into both banks of cylinder bores after being drawn from the bottom tank of the radiator block. Its removal can be effected with or without the coolant pump in situ by following the removal sequence.

REMOVAL AND REPLACEMENT
THE CYLINDER BLOCK CONNECTION PIPE

1. REMOVAL

Remove the coolant pump from the R.H. side of the cylinder block connection pipes as detailed on page C7 or if this is not necessary drain the cylinder block and detach the flexible hoses as detailed on page C2 and C7. Detach the cylinder block connection pipe from the front face of the cylinder block by withdrawing four bolts, two bolts at each side.

2. REPLACEMENT

The replacement of the cylinder block connection pipe is the reversal of the removal sequence.

PROTECTION AGAINST FROST

ANTI-FREEZE ADDITIVES

An anti-freeze additive must be used during cold weather and the following table indicates the amount of anti-freeze additive necessary for the protection against various degrees of frost.

To protect for 20°F of frost add: 3 Imp. pints (3½ American pints)(1.705 litres) of anti-freeze additive.

To protect for 30°F of frost add: 4 Imp. pints (5 American pints) (2,275 litres) of anti-freeze additive.

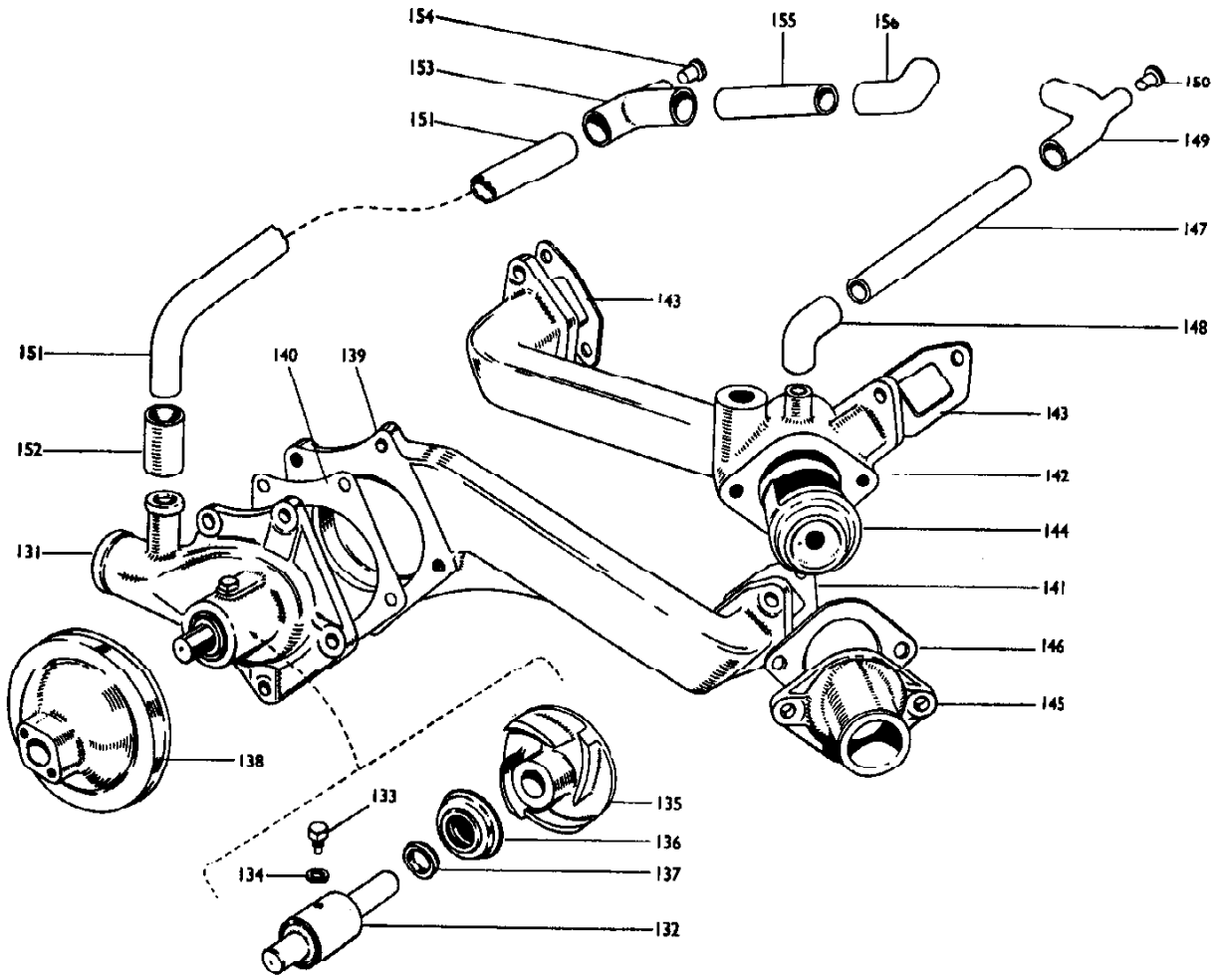


Figure C9. Exploded View of Connecting Pipes, Coolant Pump and Thermostat Unit.

131 Coolant Pipe Assembly.
132 Bearing and Shaft Assembly.
133 Bearing Locating Bolt.
134 Fibre Washer.
135 Coolant Pump Impeller.
136 Carbon Faced Rubber and Spring Seal Assembly.
137 Thrower Ring.
138 Belt Drive Pulley.
139 Cylinder Block Connection Pipe.
140 Coolant Pump Joint Washer.
141 Connection Pipe Joint Washer.
142 Cylinder Head Connection Pipe.
143 Connection Pipe Joint Washer.
144 Thermostat Unit.
145 Thermostat Housing Outlet.
146 Thermostat Housing Joint.
147 By-pass Pipe to Carburettor.
148 Rubber Elbow.
149 Rubber "Tee" Piece.
150 Rubber "Tee" Piece Plug.
151 Long By-Pass Pipe to Coolant Pump.
152 Rubber Connection.
153 Rubber "Tee" Piece.
154 Rubber "Tee" Piece Plug.
155 Short By-Pass Pipe to Coolant Pump.
156 Rubber Elbow.

To protect for 40°F of frost add: 5 Imp. pints (6 American pints) (2.841 litres) of anti-freeze additive.

To protect for 50°F of frost add. 6 Imp. pints (7 American pints) (3.410 litres) of anti-freeze additive.

To protect for 60°F of frost add: 7 Imp. pints (8½ American pints)(3.978 litres) of anti-freeze additive.

Before adding the anti-freeze additive to the cooling system read the directions supplied by its manufacturer and ensure that:-

(i) All cylinder head, coolant pump and thermostat nuts are fully tightened as the coolant will be of a "searching" nature due to the addition of the anti-freeze additive.

(ii) All rubber hoses and pipes are in a good condition and all clips are effecting leak proof seals.

(iii) Mark the filler cap denoting the cooling system contains anti-freeze additive. A label is usually supplied by the anti-freeze manufacturer.

MAINTENANCE OF CORRECT WORKING TEMPERATURE IN COLD WEATHER

In exceptionally cold weather it may be found that the engine does not warm up quickly and some difficulty may be experienced in holding its normal working temperature. While the use of radiator blinds and muffs are not recommended as the cooling system is thermostatically controlled some owners may feel their fitting a necessity.

When these extras are fitted the engine temperature should be observed more frequently than is normal in order to avoid overheating.

DRAINING THE COOLING SYSTEM CONTAINING AN ANTI-FREEZE ADDITIVE

When the cooling system has been filled with coolant containing an anti-freeze additive mark the radiator filler cap so that it will not be inadvertantly drained. The manufacturers of the anti-freeze additive usually include one in their pack.

If it is necessary to drain the coolant when it has an anti-freeze additive included, clean the three draining points thoroughly and then position suitable receptacles beneath these points to trap the coolant which can then be filtered and stored for re-use.