

SECTION N

Cooling System

The engine is cooled by water circulation through passages in the cylinder block and cylinder head. Circulation is by thermo-syphon action, assisted by an impeller type water pump, belt driven from the crankshaft pulley.

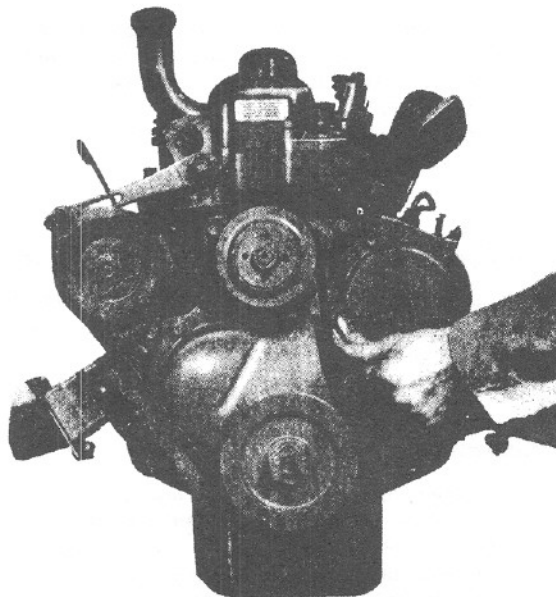
FAN BELT

To Adjust the Fan Belt

Fan belt adjustment is achieved by altering the position of the generator as detailed below.

1. Slacken the generator adjusting lever setscrew.
2. Slacken the two generator to bracket mounting bolts.
3. Move the generator either towards or away from the engine to either slacken or tighten the belt.
4. Lock in the desired position by tightening the generator adjusting lever setscrew.
5. Check the tension, if correct, the tension is such that without undue pressure, the thumb applied midway between the water pump and crankshaft pulleys can depress the belt approximately $\frac{1}{8}$ in (10 mm) as shown in Fig. N.1.
6. If the tension is correct tighten the two generator to bracket mounting bolts.

NOTE: When a new belt is fitted, it is advisable to recheck the adjustment after only a comparatively short running period. This is to allow for the initial stretch which is common to new belts, once this initial stretch has taken place the belt may be checked in accordance with Periodical Attentions.



N1

To Remove the Fan Belt

1. Slacken the generator adjusting lever setscrew.
2. Slacken the generator to bracket mounting bolts.
3. Pivot the generator towards the cylinder block.
4. Turn the engine slowly by hand and work the fan belt off the water pump pulley.
5. The belt can now be lifted from the generator and crankshaft pulleys and removed from the engine.
6. Examine the belt for signs of fraying or cracks in the rubber and renew if necessary.

To Refit the Fan Belt

Refitting the belt is just a reversal of the removal operations. Adjust the belt tension as previously detailed under the heading "To Adjust the Fan Belt".

If a new belt has been fitted refer to the note given after the details on fan belt adjustment.

WATER PUMP

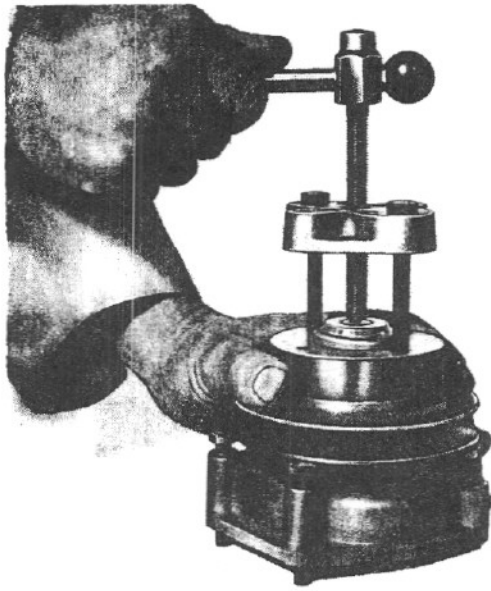
General

Two different types of pump are used, depending upon the application. In one type of pump the impeller shaft is supported by two separate bearings, as shown in Fig. N.3 and in the other the bearings are combined with the shaft to form one assembly, as shown in Fig. N.4. The latest pumps of both types incorporate a stationary seal that registers on a ceramic counterface revolving with the impeller. Earlier pumps incorporate a revolving seal that registers on a stationary counterface fitted in an insert fixed to the pump body, as shown in Fig. N.5. In earlier pumps to the type shown in Fig. N.5, the seal registers directly on to the insert.

To Remove the Water Pump

1. Tap back the locking tabs, remove the fan securing setscrews and remove the fan (and adaptor where fitted).
2. Remove the fan belt as previously detailed.
3. Unscrew the four setscrews securing the water pump and back plate to the cylinder block.
4. Remove the water pump and backplate.

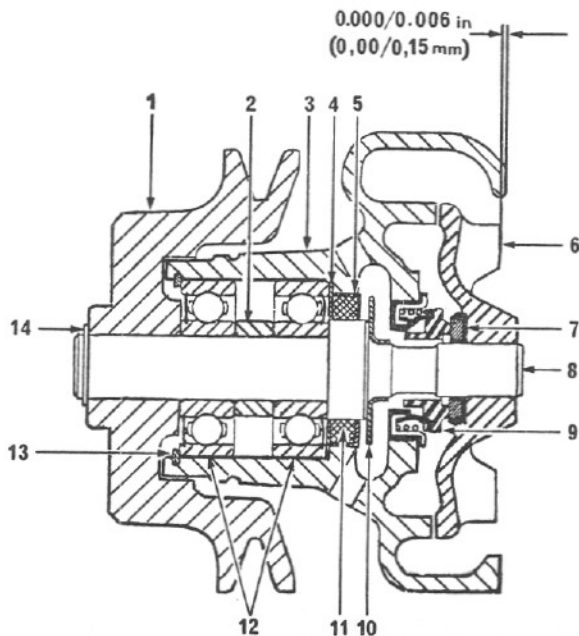
COOLING SYSTEM—N.2



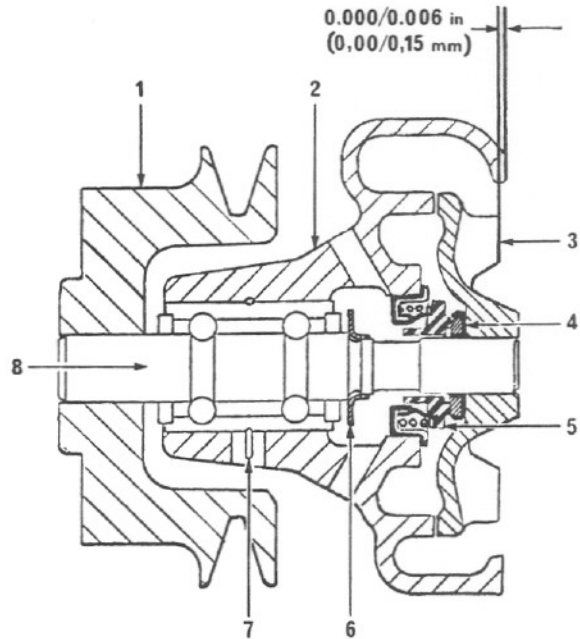
N2

To Dismantle the Separate Bearing Type Pump (Fig. N.3)

1. Where necessary remove the pulley circlip (14) and using a suitable puller, remove the pulley (1) as shown in Fig. N.2. Make a note of the position of any pump securing setscrew that has been trapped in its location by the pulley.
2. Using a suitable adaptor that will pass through the bearings, press out the shaft (8) through the rear of the pump complete with the impeller (6), counterface (7), seal (9) and thrower (10).
3. Press the impeller from the shaft and remove the counterface, seal and thrower.



N3



N4

4. Remove the bearing circlip (13) and using a suitable adaptor, press the bearings (12) and distance piece (2) out through the front of the body (3).
5. Remove the seal retaining flange (4), felt seal (11) and seal retainer (5).

To Dismantle the Combined Bearing and Shaft Type Pump (Fig. N.4)

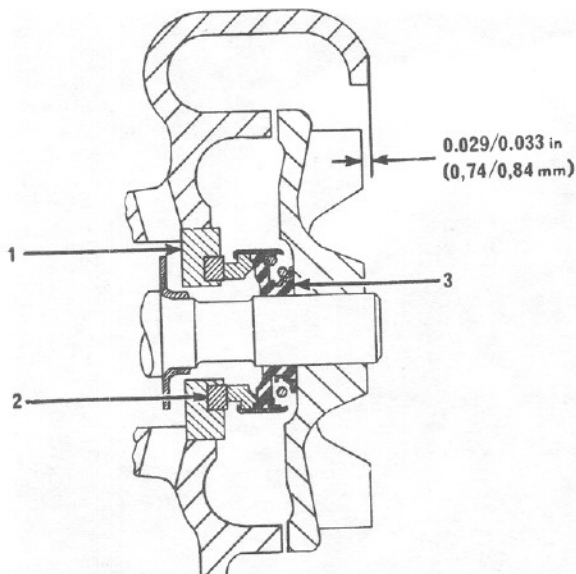
1. Using a suitable puller, remove the pulley (1), as shown in Fig. N.2. Make a note of the position of any pump securing setscrew that has been trapped in its location by the pulley.
2. Remove the clip (7) through the aperture in the pump body (2).
3. Press the bearing and shaft assembly (8) out through the rear of the pump complete with the impeller (3), counterface (4), seal (5) and thrower (6).
4. Press the impeller from the shaft and remove the counterface, seal and thrower.

To Dismantle Earlier Type Pumps (Fig. N.5)

This is the same as for the later types detailed above except that the insert (1) will be pressed out with the shaft and impeller.

Inspection

1. Examine the pump body for cracks, corrosion or any other damage. Check that the seal housing bore is not damaged. Renew where necessary.
2. Examine the shaft and bearing assembly for wear or corrosion. Renew where necessary.
3. Examine the water thrower flange for damage or corrosion. Renew where necessary.



N5

4. Examine the water pump seal, counterface or insert for excessive wear, scoring or cracks on the sealing faces. Renew where necessary.
5. Remove rust and scale from the impeller and examine for excessive corrosion or other damage. Renew where necessary.
6. Examine the pump pulley for signs of cracks, corrosion or any other damage. Renew where necessary.

To Assemble the Separate Bearing Type Pump (Fig. N.3)

1. Position the thrower (10) in its compartment in the pump body (3) with the central protrusion of the thrower towards the rear.
2. Insert the seal retainer (5) and position the felt seal (11) and seal retaining flange (4) with the dish of the flange towards the felt seal.
3. Press the bearings (12) and distance piece (2) on to the shaft (8) with the shielded faces of the bearings facing outwards to the front and rear ends of the shaft and three quarters fill the bearings and space between the bearings with high melting point grease.
4. Press the bearings and shaft assembly into the body, ensuring that the shaft passes through the thrower. Fit the retaining circlip (13).
5. Press the thrower into its position on the shaft.
6. Locate any pump securing setscrews that cannot be fitted after the pulley (1) is in position.
7. Press the pulley on to the shaft until it abuts the front bearing and where applicable, fit the pulley circlip (14). When the pulley is fitted during production, a pressure of $2\frac{1}{2} - 3 \text{ tonf/in}^2$ ($3,94/4,73 \text{ kgf/mm}^2$) is required. If a substantially reduced pressure will press the pulley on the shaft, a replacement pulley and/or shaft should be fitted.
8. Ensure that the carbon sealing face of the seal (9) is clean and fit the seal squarely in its housing.

9. Check that the sealing face of the counterface (7) is clean and position the counterface, by hand only, with the sealing insert registering with the carbon face of the seal.
10. With the pump resting on the front end of the shaft and the pump body unsupported, press on the impeller (6) until the rear face of the impeller vanes is $0.000/0.006 \text{ in}$ ($0,00/0,15 \text{ mm}$) below the rear face of the body.

To Assemble the Combined Bearing and Shaft Type Pump (Fig. N.4)

1. Press the bearing and shaft assembly (8) into the pump body (2), with the smaller diameter end towards the rear, until the retaining clip grooves of the bearing and body align. Fit the retaining clip (7).
2. Locate any pump securing setscrews that cannot be fitted after the pulley (1) is in position and press the pulley on to the shaft until the front end of the pulley is flush with the front end of the shaft.
3. Press the thrower (6) into its position on the shaft.
4. Ensure that the carbon face of the seal (5) is clean and fit the seal squarely into its housing.
5. Check that the sealing face of the counterface (4) is clean and position the counterface, by hand only, with the sealing insert registering with the carbon face of the seal.
6. With the pump resting on the front end of the shaft and the pump body unsupported, press on the impeller (3) until the rear face of the impeller vanes is $0.000/0.006 \text{ in}$ ($0,00/0,15 \text{ mm}$) below the rear face of the pump body.

To Assemble Earlier Type Pumps (Fig. N.5)

This is the same procedure as for the later types detailed above except for the following points.

Before assembly, thoroughly clean the insert recess and drain hole in the body with cleaning spirit or Locquic 'Q'.

After fitting the bearings and shaft assembly and the thrower, lightly coat the locating diameter of the insert (1) and the inner diameter of the insert recess with grade 'AVV' Loctite. Ensure that the counterface (2) is clean and press the insert home with the counterface to the rear of the pump. Clean off any surplus Loctite. When pressing in the insert, ensure that the sealing face of the counterface is not damaged. Check that the carbon face of the seal (3) is clean and position the seal with this face registering on the counterface.

With the pump resting on the front end of the shaft and the body unsupported, press on the impeller until the rear face of the impeller vanes is $0.029/0.033 \text{ in}$ ($0,74/0,84 \text{ mm}$) below the rear face of the pump. On earlier pumps where the seal face registers directly on to the insert with no counterface fitted, the impeller should be pressed on to the shaft until the clearance between the front face of the impeller and the water pump body is $0.005/0.010 \text{ in}$ ($0,12/0,15 \text{ mm}$). This can be checked by means of a feeler gauge through the outlet channel of the pump body.

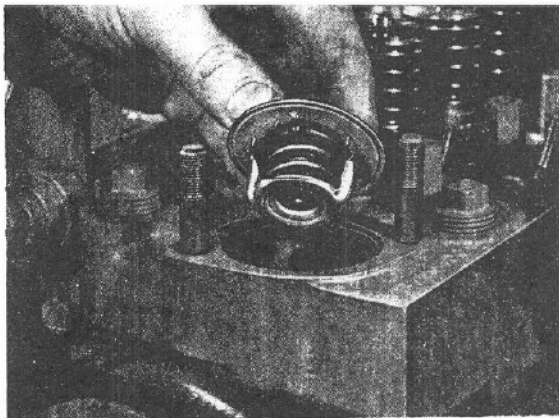
block with the four setscrews.

3. Refit the fan belt and adjust to the correct tension.
4. Refit the fan using new lockwashers.

THERMOSTAT

To Remove the Thermostat

1. Drain the coolant from the radiator.
2. Remove the water hose from the engine water outlet connection at the front of the cylinder head.
3. Remove the two nuts and washers securing the outlet connection to the thermostat housing.
4. Remove the outlet connection and joint.
5. Lift out the thermostat as shown in Fig. N.6.



N6

To Test the Thermostat

1. Immerse the thermostat in a suitable container of water and slowly heat. An accurate thermometer should be available to check the temperature of the water as it rises.
2. Note the temperature at which the valve in the unit commences to open. This temperature should be as stamped on the unit by the manufacturers.
3. If the unit does not function properly then a replacement thermostat will be required, as no adjustment of these units is possible.

To Replace the Thermostat

Replacing the thermostat is a reversal of the removal procedure. A new joint should be fitted between the thermostat housing and the water outlet connection

When the radiator has been refilled with coolant, check that no leaks are visible.