



Cooling System

DRAINING AND REFILLING

There are two drain points provided. These are at the bottom of the radiator and at the right hand side of the cylinder block. See Figs. E:1, 2 and 3.

1. If the system contains anti-freeze solution and it is required for re-use, the coolant should be drained into a clean container.

2. To avoid an air lock in the system set the heater control to the "HOT" position. Open the drain points and slowly remove the pressure cap from the radiator or expansion tank. If the engine is hot, allow it to cool before removing the filler cap. When the coolant has completely drained, probe the drain point orifices to ensure that sediment, scale, etc., has not prevented the entire contents from draining away. Do not overdo the probing and only use light wire.

NOTE: If the car is to be left standing with the cooling system drained, it is advisable to leave an indication to this effect.

3. To refill the system, check that the heater control is set to "HOT" and close the system drain points. Fill the system slowly to avoid air locks. Run the engine until warm and check for leaks. Recheck that the coolant level is within 1 in (25mm) below the bottom of the radiator filler neck and top-up if necessary. If fitted, check that the level in the expansion tank is 6 in (152mm) below the bottom of the tank filler neck. Refit the pressure cap, and sealing cap where applicable.

FLUSHING

The use of commercial solvent is recommended and in this case the solvent manufacturer's instructions should be followed.

1. Drain the cooling system as described previously. Run clean water through the system until the water runs clear from the drain points. Close the drain taps and fill the system. Run the engine to circulate the water then switch off and allow to stand for a few minutes before draining. Drain and flush again with clean water.

2. In extreme cases flush the engine, radiator and heater separately and in the reverse direction to the normal coolant flow, i.e. cylinder head from water outlet down, and the radiator from

the bottom outlet pipe up. Reconnect any hoses which were removed and refill the system as described below.

PRESSURE TEST

It is advisable to check the cooling system pressure for leaks periodically. This procedure will involve a visit to a local dealer who will have the necessary equipment. However if you can borrow a pressure tester the procedure can be carried out as follows:

1. To test the complete cooling system for leaks, remove the pressure cap and fit a pressure tester in its place (Fig. E:4). Pump up the tester until a pressure of 14 psi. (1 kg/cm²) is indicated on the gauge.

2. If the pressure drops once the pumping is stopped, visually inspect all the parts for leaks. If not external leaks are present and the pressure continues to drop, inspect the engine oil on the dipstick to determine whether or not the coolant is leaking into the crankcase due to a cracked cylinder block or a leaking cylinder head gasket.

3. To check for compression or combustion leakage in the cooling system, run the engine until it reaches operating temperature. With the engine running and the tester installed, pump up the system again. The pressure must NEVER be allowed to build up more than 14 psi (1 kg/cm²). Any fluctuation of the tester dial needle indicates a compression or combustion leak.

4. To locate the leaking cylinder, disconnect the spark plug leads, one at a time, and observe the tester dial. When the plug lead is removed from the leaking cylinder, the indicator will stop fluctuating. If more than one cylinder is leaking, removing the spark plug lead from an offending cylinder will cause the fluctuations to become less frequent. If the cylinder head gasket is leaking it must be replaced.

5. If the pressure cap is suspect it can be checked (Fig. E:5) using the pressure tester. The cap should be capable of retaining pressure within its specified range. However, as the pressure cap is a relatively inexpensive item it would normally be more expedient to replace it as a matter of course.

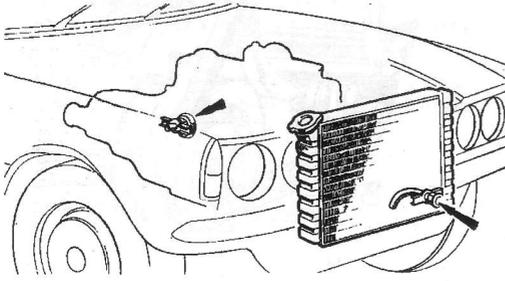


Fig. E:1 Cooling system drain points

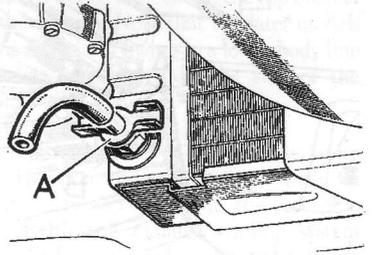


Fig. E:2 Radiator drain tap

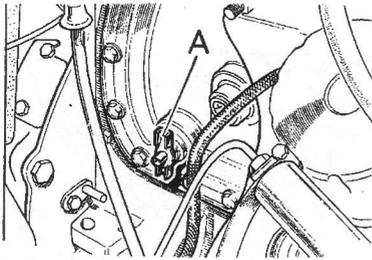


Fig. E:3 Cylinder block drain plug

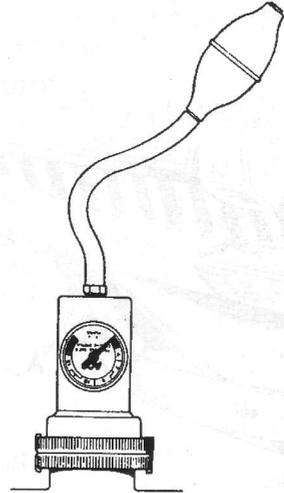


Fig. E:4 Testing the cooling system

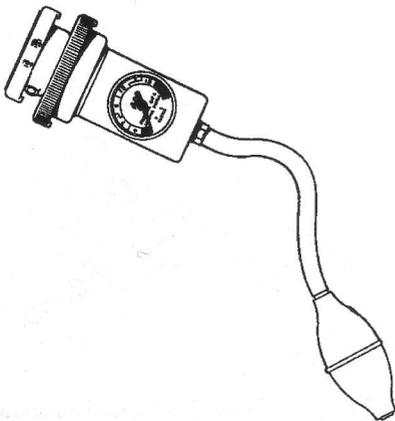
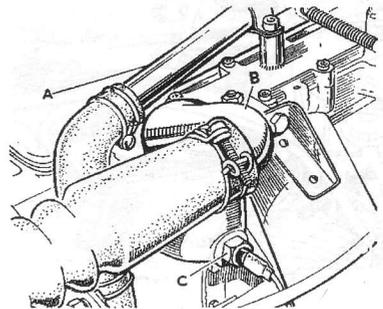


Fig. E:5 Testing the filler cap



- A. Heater pipe
- B. Thermostat housing
- C. Water temperature sender unit

Fig. E:6 Details of thermostat housing

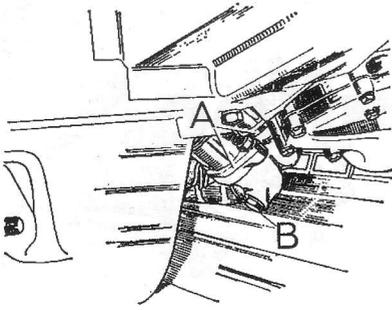
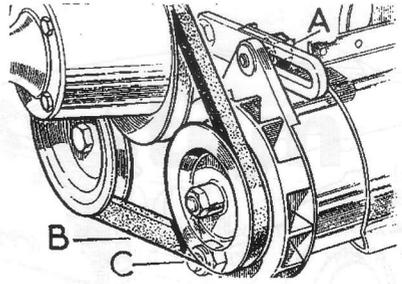


Fig. E:7 Oil cooler pipe connections



- A. Adjusting bolt
- B. Tension checking point
- C. Pivot bolts

Fig. E:9 Adjusting the fan belt on models fitted with a generator

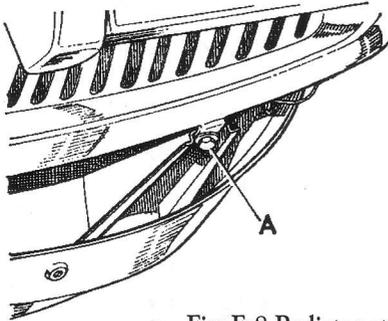
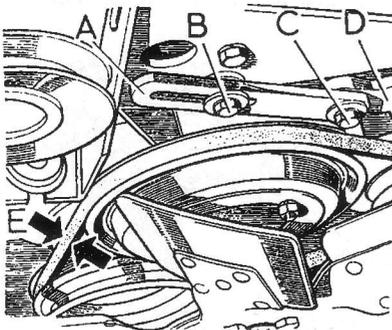
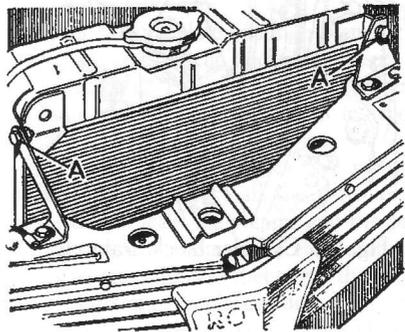


Fig. E:8 Radiator attachment points



- A. Adjustment link
- B. Adjustment bolt
- C. Link pivot bolt
- D. Alternator
- E. Tension checking point

Fig. E:10 Adjusting the fan belt on models fitted with an alternator

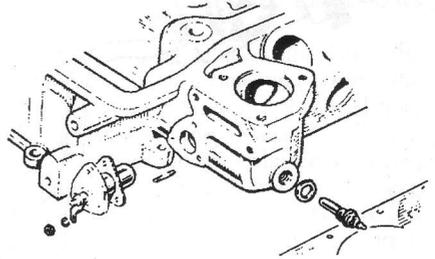


Fig. E:11 Choke light and temperature sender unit location

THERMOSTAT

Should the thermostat be suspect it is wiser to replace it as it is a relatively inexpensive item. The procedure is as follows:

1. Open the radiator drain tap and drain off about 7 pint (4 litres). If you want to keep the coolant use a clean drain tray. Close the tap.
2. Loosen and remove the hose from the front end of the heater pipe Fig. E:6. Detach the pipe from the manifold and move it to one side.
3. For models fitted with crankcase emission control remove as follows.
 - a). Diaphragm type: Detach the control valve support bracket.
 - b). Flame trap type: Disconnect the hose at the carburettor, detach the support bracket from the thermostat housing and move the flame trap to one side.
4. Disconnect the top hose from the thermostat housing.
5. Loosen and remove the three nuts and spring washers retaining the thermostat housing and lift off the housing and gasket.

NOTE: The gasket may stick to the cylinder head face and it should be removed with a suitable scraper before fitting a new gasket.

6. Make sure that the mating faces of both the thermostat housing and cylinder head are clean and free from old gasket material and fit a new gasket. You may wish to use some sort of sealer such as Hermetite in which case the sealer should be applied to the cylinder head and the gasket placed on top. Apply sealer to the thermostat housing and fit the housing to the cylinder head.
7. Ensure that all the items removed are replaced. Refill the cooling system and check for leaks. Start the engine and run it to normal operating temperature and check for leaks again.

RADIATOR

On occasions it will be necessary to remove the radiator for various engine operation, etc. Carry out the procedure as follows.

1. Drain the cooling system as detailed earlier in the section.
2. For models fitted with an oil cooler such as the TC the removal detail differs as follows:
 - a). Remove the drain plug at the cooler and drain out the oil in Fig. E:7.
 - b). Disconnect the battery leads and remove the tray.
 - c). Release the clips securing the oil cooler pipes to the base unit.
 - d). Disconnect both the oil pipes at the cooler by removing the retaining nuts and pulling the pipe flange away from the cooler (Fig. E:7). Remove the 'O' rings from the cooler unions.
3. For all models detach the top and bottom

radiator hoses from the radiator.

4. Now remove the three retaining bolts from the radiator as shown in Fig. E:8 - two at the top bracket and one at the bottom. Note that the later models have the same fixing, but owing to a lower body line the radiator cap was moved to the side of the radiator tank.

5. Lift out the radiator.

6. The radiator is installed in the reverse order to removal. However on models fitted with an oil cooler use new 'O' rings at the oil pipe connections. Refill the radiator cooling system and check for leaks in the oil cooler and top and bottom hoses.

NOTE: To facilitate the replacin of the top and bottom hoses a light smear of grease on the inside radius of the hose will be of great help.

WATER PUMP

If the pump is leaking or coolant is not being circulated through the radiator (assuming the thermostat is not jammed shut) then the water pump will have to be removed as follows.

1. Remove radiator as described above.
2. Slacken off the generator/alternator adjustment and pivot bolts and remove the fan belt.
3. Detach the cooling fan by first removing the four nuts bolts and washers retaining it to the water pump. Remove the cooling fan, water pump pulley and reinforcing plate and shims, if fitted.
4. Remove the bolt securing the generator/alternator adjusting link to the water pump and swing the link away from the pump.
5. Disconnect the hoses from the water pump, and remove the six pump retaining screws and washers from the pump.
6. Detach the pump from the cylinder block.
7. Overhauling the water pump is not really a practical proposition when you think of the retail price of a new pump. Overhaul will involve you in using special tools and the fitting of component parts. So fit a new pump.
8. Fitting a new pump is the reverse order to that of removal with the following observations. Make sure to fit the shims removed from the pump flange if they were fitted. Fit the reinforcing plate and fan pulley. Use shims if necessary to correct the alignment. Adjust the fan belt.

FAN BELT

It is important that the correct tension of the fan belt be maintained to ensure efficient operation of the cooling and electrical systems. Too much tension will place undue strain on the water pump and generator or alternator bearing and cause excessive wear of the drive belt.

Vehicles Fitted with a Generator

1. Check the tension of the belt midway between the generator and crankshaft pulleys (Fig. E:9). A movement of approx. 3/8in (10mm) should be present.
2. To adjust the belt tension, slacken the adjustment bolt (A), and the two pivot bolts (C). Move the generator towards or away from the engine as necessary to obtain the correct tension and tighten the bolts.
3. Check the condition of the fan belt periodically and replace if excessively worn, nicked, stretched, or otherwise unserviceable. To replace the fan belt, proceed as for adjusting but press the generator fully towards the engine and detach the belt from the pulleys. Fit the new belt, adjust to give the correct tension and tighten the generator bolts. The belt tension should be rechecked after approximately an hour's running as the belt will then be "run-in".

Vehicles Fitted with an Alternator

The adjustment and replacement procedure is similar in this case, but the tension should be checked between the crankshaft and fan pulleys (Fig. E:10). Both bolts at the adjustment link should be slackened when adjusting the tension.

TEMPERATURE SENDER UNIT

The sender unit is fitted into the cylinder head Fig. E:9 thermostat housing. The sender unit transmits the temperature to the warning gauge via a cable located in the main loom and a voltage stabiliser.

1. If you have a faulty reading on the gauge remove the sender unit wire and touch the wire to earth. A suitable paint free metal surface is easily found.
2. Note whether the gauge needle moves up to hot. If it does then a new sender unit is required. If it doesn't then suspect either the circuit to the gauge or the gauge itself. The gauge will have to be tested by fitting another one.
3. To remove the sender unit it will be necessary to drain off part of the coolant, approx. 6 pints (3.4 litres) will do. Unscrew the sender unit from the thermostat housing. When fitting a new unit fit a new washer as well.

CHOKE WARNING LIGHT

1. The choke warning light is connected to the warning switch by a cable and Lucar connector. The sender unit switch is located on the front of the thermostat housing (Fig. E:11) and is retained by three nuts and washers on studs. If the choke light fails to come on when the choke is out suspect the switch wiring, or if the light does not go out when the choke is in suspect the switch.
2. As with the temperature sender unit; drain off part of the coolant and remove the choke warning switch and its cork gasket.
3. Refit a new switch in the reverse order of removal. Check the choke operation.

ANTI-FREEZE

Anti-freeze should be used all year round. The Rover engine is of aluminium construction and is more likely to corrode if an inhibitor is not used. During the Winter months an anti-freeze mixture must be used to protect the system from frost damage. An inhibited Ethylene Glycol type anti-freeze is recommended and should be diluted as shown in TECHNICAL DATA.

1. Before putting anti-freeze into the system check that the cylinder head nuts are tightened to the correct torque. Check that all the hoses are in good condition and that clips and connections are tight and secure. remove all defective parts as necessary.
2. Secondly drain and flush the system then close both drain taps and fill the system with approximately 8 pints (4.5 litres) of water. Then add 5.5 pints (3 litres) of anti-freeze and top up the system with water to within 1 in (25mm) below the filler neck.
3. Now run the engine to circulate the mixture. Check the system for leaks when the engine has reached operating temperature. Small leaks in the radiator can be cured by the addition of 'Bars leaks' or a similar additive.
4. With the system in good order attach a label to the radiator to record the date of filling. You will want to know this as most anti-freezes only last approx. 2 years.
5. For topping up purposes mix up a solution of water and anti-freeze to the correct strength and store it in a container.

Technical Data

Cooling system capacity	14 Imp pints (8 litres)
Thermostat setting	Opens at 77°C(170°F)
Pressure cap rating	
Early models	5psi (0.35 kg/cm ²)
Later models	7psi (0.5 kg/cm ²)
Fan belt tension	0.37 in (10mm) approx.
Compressor belt tension	0.5 in (12.5mm) approx.
Anti-freeze solution	
For 33 1/3% solution	Add 5 imp pints (2.8 litres)
For 50% solution	Add 7 imp pints (4 litres)
To bring 33 1/3% to 50%	Add 3.5 imp pints (21 litres)
33 1/3% solution will give frost protection down to -25°F (-32°C)	