

Section C5

Servicing the Refrigerant and Coolant

Refrigeration system - To discharge, purge or drain

1. The refrigerant must be discharged from the system prior to breaking any joint.
2. Refrigerant discharged in the presence of an open flame will not burn, but decompose to form a poisonous gas. Always wear goggles when carrying out work which involves opening refrigerant lines.
3. Remove the protective cap from the service connection of the suction throttling valve (see Fig. C4). Secure a length of pipe to the 'Schrader' valve adapter (RH 7937) in such a manner that the free end of the pipe clears the car and rests at a level below the suction throttling valve; place a clean container under the end of the pipe (see Fig. C5).
4. Tighten the adapter to depress the valve core until a hissing sound is heard, indicating that the refrigeration gas is escaping to atmosphere.
5. Care must be taken not to release the refrigerant too quickly as this will result in oil being drawn from the system. If any trace of oil is detected loosen the adapter. The operation should require at least fifteen minutes to ensure complete discharge.

Note Any oil which is discharged into the container should be measured as a corresponding amount must be added to the system.

6. When all the refrigerant gas appears to have escaped to atmosphere, slacken the adapter to close the valve and allow approximately 2 minutes for any build-up of pressure in the system to develop, then repeat the discharge procedure.

The operation should be repeated until there is no sign of refrigerant gas being issued through the adapter after 2 minute build-up period.

Refrigeration system - To evacuate

1. Obtain a vacuum pump assembly (charging station) suitable for use in the servicing of motor car air conditioning systems.
2. Fit the 'Schrader' valve adapter (RH 7937) to the vacuum pump connection.
3. Remove the protective cap from the rear service connection of the suction throttling valve (see Fig. C4).
4. Fit the 'Schrader' valve adapter to the rear service connection of the suction throttling valve.
5. Switch on the vacuum pump and observe the vacuum gauge. When a reading of 71 cm. Hg. (28 in. Hg.) or when the maximum possible vacuum that can be obtained from the prevalent barometric conditions is reached, allow the vacuum pump to continue drawing a vacuum for a further 15 minutes.

Note The vacuum of 71 cm. Hg. (28 in. Hg.) is only available at or near sea level. Therefore, this figure should be reduced by 2,54 cm. Hg. (1 in. Hg.) for every 300 metres (1 000 ft.) above sea level [e.g. if the refrigeration system is

evacuated at 1 500 metres (5 000 ft.) above sea level a vacuum of 58 cm. Hg. (23 in. Hg.) should normally be obtained].

6. Switch off the vacuum pump. If the system loses vacuum quickly, a leak is prevalent. If the system loses vacuum extremely slowly a leak is possible.
7. In these conditions, it is advisable to further evacuate for 45 minutes to eliminate the possibility of residual liquid refrigerant in the compressor oil vapourising and creating a pressure rise in the system.

The final vacuum reading obtained should be held for 30 minutes to ascertain that there are no leaks in the system.

Refrigeration system - To sweep

1. Evacuate the system and charge with 0,45 kg. (1 lb.) of Refrigerant 12. In some cases when the ambient temperature is low, it may be necessary to start the engine and switch on the system in order to draw in the refrigerant. Run the engine for a further ten minutes with the blower motors at full speed.
2. Switch off the system and stop the engine.
3. Allow 5 - 10 minutes for the refrigerant pressure to equalise.
4. If loss of refrigerant pressure is apparent the system should be checked for leaks using an electrical leak detector. If the system maintains its pressure it is ready for charging.

Refrigeration system - To charge

Before charging the system, it is necessary to **evacuate** and **sweep** the refrigeration system (refer to this Section C5).

1. Attach a cylinder of Refrigerant 12 to the appropriate connection on the vacuum pump apparatus.
2. Open the valve on the cylinder and purge the line between the cylinder and the vacuum pump apparatus.
3. Suspend the cylinder on a spring balance and note its weight.
Note If a 'charging station' or other suitable refrigeration system servicing equipment is used follow the manufacturer's instructions.
4. Open the tap on the vacuum pump apparatus to enable the refrigerant to flow into the system.
Note If refrigerant does not flow freely into the system, it maybe that the 'Schrader' valve core at the service connection of the suction throttling valve is not sufficiently depressed.
5. Ensure that the parking brake is applied and the transmission in either 'Park' or 'Neutral'.
6. Start the engine, and run at 1 000 r.p.m. to 1 250 r.p.m.

7. Move the temperature selector dials to their full anti-clockwise positions. Open the two circular facia outlets and the rectangular facia outlet. Move the air conditioning (function) switch to the AUTO position.

8. Allow 0,45 kg. (1 lb.) of refrigerant to pass into the system, close the tap on the vacuum pump apparatus and switch off the engine.

9. Check all joints in the system for leaks with an electrical leak detector. If the system is leak free, continue the charging operation and increase the weight of the refrigerant in the system to 1,02 kg. (2.25 lb.).

10. If a leak or leaks are detected they must be rectified and the whole evacuation and charging operation repeated.

Note The presence of bubbles or foam passing through the receiver/drier sight glass is not a reliable indication of refrigerant deficiency if the ambient temperature is below 24°C. (75°F.).

11. Again, close the tap on the vacuum apparatus and unscrew the connection to the 'Schrader' valve of the service connection on the suction throttling valve.

12. Fit the 'Schrader' valve cap on the suction throttling valve when the charging operation is completed.

13. Again check the system for leaks using an electrical leak detector.

Oil level - Refrigeration system

The refrigeration sump is originally filled with 310 c.c. (10.5 fluid ounces U.S.) of 'Frigidare' 525 Viscosity refrigeration oil and servicing is not normally required.

During normal operation of the air conditioning system an affinity of the refrigerant for oil, causes a certain amount of the oil to circulate through the system with the refrigerant.

Should any oil escape from the system due to leakage, rapid discharge of the refrigerant or replacement of a component, it must be replaced, as it is most important that the amount of oil in the system is always correct.

If there is a surplus of refrigeration oil in the system it will result in too much oil circulating with the refrigerant, thereby reducing the cooling capacity of the system. If insufficient oil is in the system inadequate lubrication of the compressor will result.

The procedure for correcting the oil level is as follows.

Compressor

1. Ensure that the parking brake is firmly applied and the transmission is in either the 'Neutral' or 'Park' position.

2. Start and run the engine at 1000 r.p.m. to 1500 r.p.m. for 10 minutes with the temperature selector dials turned to their respective maximum anti-clockwise position and the air conditioning (function) switch to the AUTO position. This will allow the oil to distribute itself throughout the system in the normal manner.

3. Stop the engine, discharge the refrigerant (refer to this Section C5) and remove the compressor (refer to Section C7).

4. Position the compressor horizontally with the drain plugs pointing downwards.

5. Remove the drain plug. Allow the oil to drain into a clean measuring container; measure and discard the oil.

6. Pour into a clean measuring container a quantity of new refrigerant oil, the amount being determined by the following.

7. If the oil drained from the compressor is more than 44 c.c. (1.5 fluid ounces U.S.) top-up the compressor with an equivalent amount of new compressor oil.

8. If the oil drained from the compressor is less than 44 c.c. (1.5 fluid ounces U.S.) and a major oil loss has occurred, fill the compressor with 175 c.c. (6.0 fluid ounces U.S.) of compressor oil.

9. If the compressor has been overhauled, increase the quantities given in the two previous paragraphs by 30 c.c. (1.0 fluid ounce U.S.).

10. If the compressor is to be renewed instead of overhauled, the oil contained in the new compressor should be drained into a clean measuring container. This quantity should then be adjusted until the amount is the same as that drained from the original compressor.

The resultant quantity of clean oil in the container should then be poured into the new compressor, plus any oil lost during rapid discharge of the refrigerant.

Replacing components

Whenever a component of the refrigeration system is replaced, measured quantities of approved refrigerant oil must be added to the component to ensure that the total amount of oil in the system is maintained at the correct level.

Oil should be added to the components listed below at the quantities stated plus any oil lost through rapid discharge of the refrigerant.

Evaporator	Add 88 c.c. (3 fluid ounces U.S.)
Condenser	Add 30 c.c. (1 fluid ounce U.S.)
Receiver/Drier	Add 30 c.c. (1 fluid ounce U.S.)

Coolant system - To service

Refer to Chapter L of this Workshop Manual T.S.D. 2939 for any information relating to the coolant or engine coolant system.