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HEVAC – Heating, Ventilation & Air Conditioning

Early systems

Back in the “good old days” when vehicles were simple mechanical devices, ventilating and heating the interior was just a matter of opening a vent, switching on the blower and hey presto, heat and/or fresh air! The installations were fairly rudimentary, consisting of a few hoses, a heater box, blower and some controls.

Though not strictly part of the same system, the cabin heater is usually integrated into a combined heating/cooling system. It is really just a small radiator – the fan blows air (either from outside when heating OR from the condenser when cooling) into the heater box and over the fins. The fan has switchable speeds and if the switch in the cabin fails to operate correctly, resistor pack failure is the most likely culprit.

The heater core is one of most common sources of problems, especially in older vehicles due to corrosion of the core itself and/or failure of the connecting hoses. Either will result in coolant finding its way into the foot-well and this may be confused with a blocked drain in a sunroof. Removing and repairing the core can be done by the owner, but it is not a simple job.

Vehicle air conditioning is not new. It was first introduced as a retro-fit option for the 1940 Packard before slowly being adopted as a standard feature by other manufacturers (like Chrysler in 1953). Nash in conjunction with Kelvinator deployed the first really efficient system in 1954. In Australia an AMC system was first installed in 2-door Range Rovers in 1975 – much earlier than the British introduction.

Previously, a bolt-on after-market unit - the “Mark V” could be installed with relative ease. If you own a Series Land Rover or even an early Classic Range Rover, this is what you probably still have.

Regardless of type, car air conditioning robs about 3- 4% of total engine power – not very significant relative to the level of comfort provided.

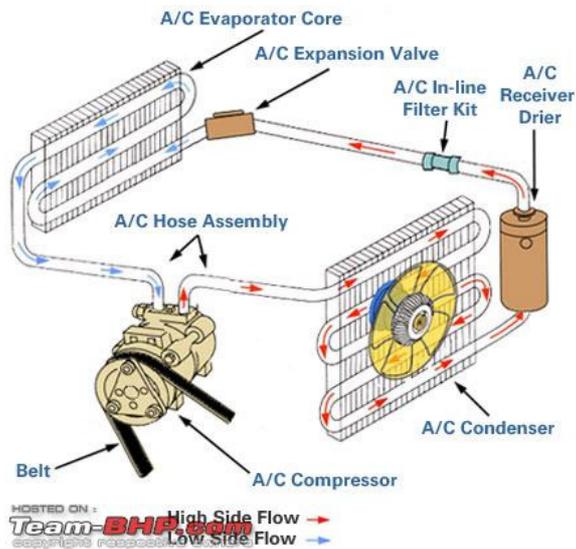
Air Conditioning Components

In the usual nature of “improvements” simple controls initially replaced the original manual arrangements and it was only a matter of time before electronic computer controls were introduced, though the basic components remain fundamentally unchanged.

The compressor changes the refrigerant into a hot gas that is subsequently cooled to a liquid state and passed to an expansion (TX) valve. The latter returns it to a low-pressure gas for cooling in the evaporator. A fan blows over the evaporator and cools the air that blows out of the vehicle’s interior vents.

The Drier absorbs contaminants including any water in the system and it must be replaced whenever the system has been opened to atmosphere.

Hoses pass the coolants through the system. They must be capable of withstanding pressures up to 300 PSI so routine examination for deterioration is essential.



Air Conditioning Coolants

The early, simple and effective R12 gas (Freon) was efficient and relatively inexpensive but was considered to contribute to depleting the earth's ozone layer so it was eventually banned (1996) and replaced by R134a gas. The latter is a known contributor of CO₂ pollution but that has not prevented its widespread use throughout the industry.

A change to R1234YF (lower carbon emission) is currently occurring and was first used in the 2014 Sport and Evoque models. R1234yf is more complex is approximately 20 times more expensive to purchase and install than R134a. It also requires specialist equipment with added built in safety measures.

Climate Control

Dual-zone automatic systems are generally now known as "Climate Control" They operate on the same basis as described above, the control systems are far more complex, usually allowing the driver (or even different occupants of the vehicle) to select the desired temperature for any particular zone. These systems are actually far more efficient in terms of providing comfort than simple air conditioning, but they come at a price, generally being installed in high-end models and being far more complex to diagnose and service.

Consisting of cabin-temperature sensors including the dashboard, also servos, vacuum motors, blend motors and a dedicated computer, servicing these systems is not for the faint-hearted. Some vehicle models are known to have ongoing problems, whereas others seem reliable. Please consult Graeme Cooper Automotive regarding your particular model. However, because the cost of licensing and compliance can only be justified by a considerable volume of work, you will most likely be referred to an auto air conditioning specialist.