

3. Receiver/drier
4. Expansion valve
5. Evaporator

The compressor is driven by the engine; the condenser is located at the front of the vehicle, in front of the radiator; the receiver/drier is located in the engine compartment; the expansion valve is usually attached to the evaporator; and the evaporator is located inside a housing in the dash, with the heater core. A schematic of a basic automotive air conditioning system with an expansion valve is shown in Fig 3.3. Note that the circuit arrows indicate refrigerant flow, and the external arrows indicate air flow.

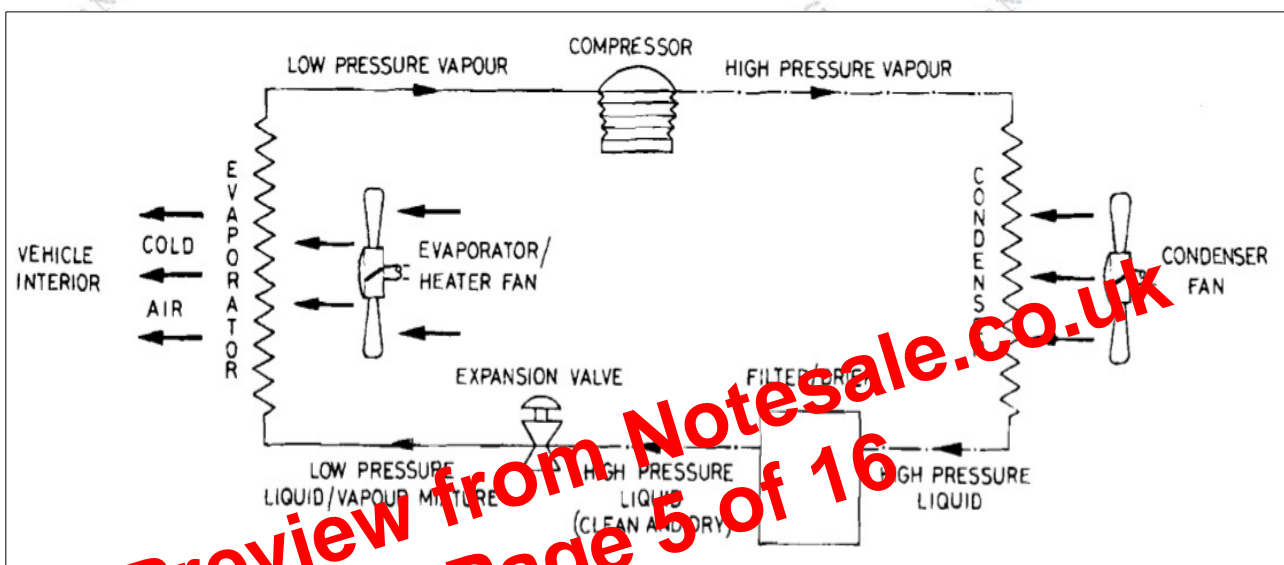


Figure 3.3: Basic Air Conditioning System Using an Expansion Valve

The *compressor* compresses the refrigerant from a low-pressure vapour to a high-pressure vapour. The high-pressure vapour is pumped into the *condenser*, where it is condensed by the cooling air flow to a high-pressure liquid. The high-pressure liquid is pumped to the *receiver/drier* (sometimes referred to as a *filter/drier*), where it is cleaned and all moisture is removed. The clean, dry high-pressure liquid is pumped to the *expansion valve*, where it is changed to a low-pressure mixture of liquid and vapour. The low-pressure refrigerant mixture is then pumped to the *evaporator*, where the remaining liquid is turned back to a low-pressure vapour, cooling the air passing over the evaporator as it does so. From the evaporator, the low-pressure vapour passes back to the compressor, which pumps it through the system again.

3.5.2 Air Conditioning System Using an Orifice Tube

The five (5) basic components used in this type of system are;

1. Compressor



Figure 3.6: A typical compressor

The clutch is engaged or disengaged both by the control panel on the dash and by the actual demands of the system. In some systems, the clutch constantly cycles compressor operation on and off. In others, the compressor runs continuously as long as the system is turned on.

Basically, all compressors fall into one of the following two categories namely *piston type compressors* and *rotary vane type compressors*. As the name implies, piston type compressors have one or more pistons arranged in either an inline, axial, radial or V configuration. Rotary vane compressors have no pistons. Scroll type compressors are also available.

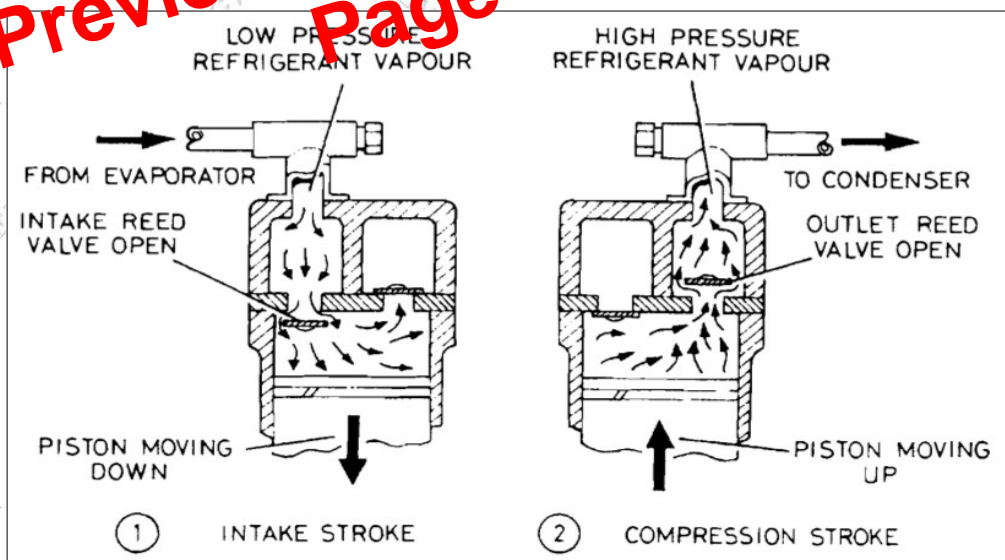


Figure 3.7: Schematic of piston type compressor operation

3.7.1 Piston Type Compressor

Piston type compressors go through an intake stroke and a compression stroke for each cylinder. On the intake stroke, the low-pressure refrigerant vapour from the evaporator is drawn into