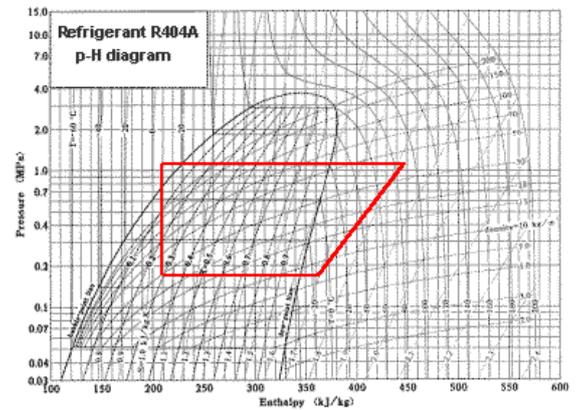
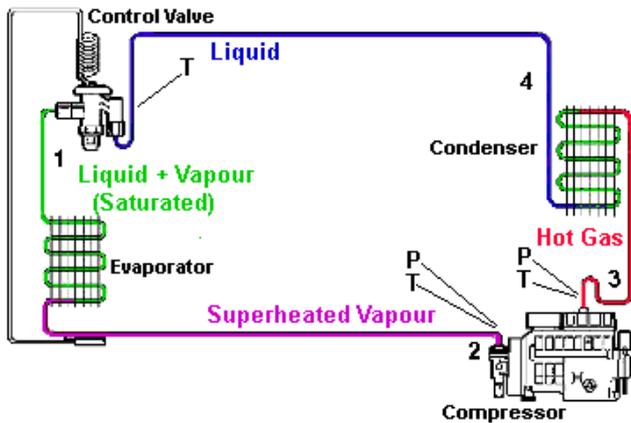


## Vapour Compression Refrigeration Cycle.



The compressor compresses the refrigerant from a relatively cool low pressure gaseous state to a high pressure & temperature gaseous state.

This hot gas enters the condenser where it dissipates its heat and condenses into liquid at high pressure, subsequently, the liquid refrigerant flows through the expansion valve or expansion control device.

The expansion valve is a component fitted between the condenser and evaporator with the function of creating a significant drop in pressure. This valve performs two functions: first of all, it ensures the correct quantity of liquid refrigerant is sent to the evaporator, and in addition it creates a pressure differential that is essential for the completion of the cycle.

The pressure differential is very important in a refrigerant circuit, as it changes the boiling point of the fluid. Without this pressure change, no cooling would take place and the system would simply be a container of liquid refrigerant.

The refrigerant in liquid form enters the evaporator, immediately boils and evaporates, absorbing heat from the surrounding space. The refrigerant now in the cool low pressure gaseous state then enters the compressor, and the cycle is repeated.

The relationship between the quantity of heat dissipated through the condenser and the quantity of heat expended due to mechanical operation, that is, the quantity of electrical energy consumed by the operation of the compressor, is called the COP (Coefficient of Performance) and depends on the evaporation and condensing temperatures and the intrinsic quality of the unit.

### Heat Pump Operation.

Reversing the flow of the refrigerant inside the refrigerant circuit creates a situation in which the evaporator is outside and the condenser inside. In this way, the heat is transferred to the air inside the space, heating it, while the outside is cooled.

Reversing the cycle requires the installation of a 4-way valve in the circuit. This valve sends the refrigerant to the indoor coil or the outdoor coil (no longer referred to as condenser and evaporator, as their functions have been exchanged) depending on whether cooling or heating is required. The latter (heating mode) is defined as heat pump operation, and means that the unit can also be used during winter.

Another concept involves the recovery of heat that is generated during the operation of an air-conditioning installation. In this case, the heat generated can be used to heat one space while another space is cooled at the same time. This is what happens in supermarkets, which in the winter use the heat dissipated by the condenser in the refrigeration system (used for the operation of the refrigerated display cases) to heat the environment where people are present.