

Tips & Technology

For Bosch business partners

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Electrics/Electronics



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Invented for life

Air conditioner service

Although the new refrigerant R1234yf has already been introduced, vehicle manufacturers will still be allowed to fit new vehicles with air conditioners using refrigerant R134a until 2016. As vehicles have an average life of 20 years, this means servicing of air conditioners with R134a will continue to be a routine workshop task.

These days, an air conditioning system is a standard vehicle feature. More than 60% of small vehicles and 90% of medium and premium class models are now equipped with air conditioning systems. Air conditioners are available at least as an option for the majority of small cars. Both passenger and commercial vehicles are increasingly being fitted with air conditioning. So sooner or later there will hardly be any vehicles without such systems.

Vehicle air conditioners require regular servicing. As much as 10% of the refrigerant is lost from the air conditioning system every year through the hoses and connecting elements. This not only reduces system performance, it may also lead to damage. Regular servicing can help to avoid expensive repair work. The cooled air in the passenger compartment not only increases ride comfort but also makes driving safer. Regular checking ensures that no refrigerant escapes and pollutes the environment.

Air conditioner components

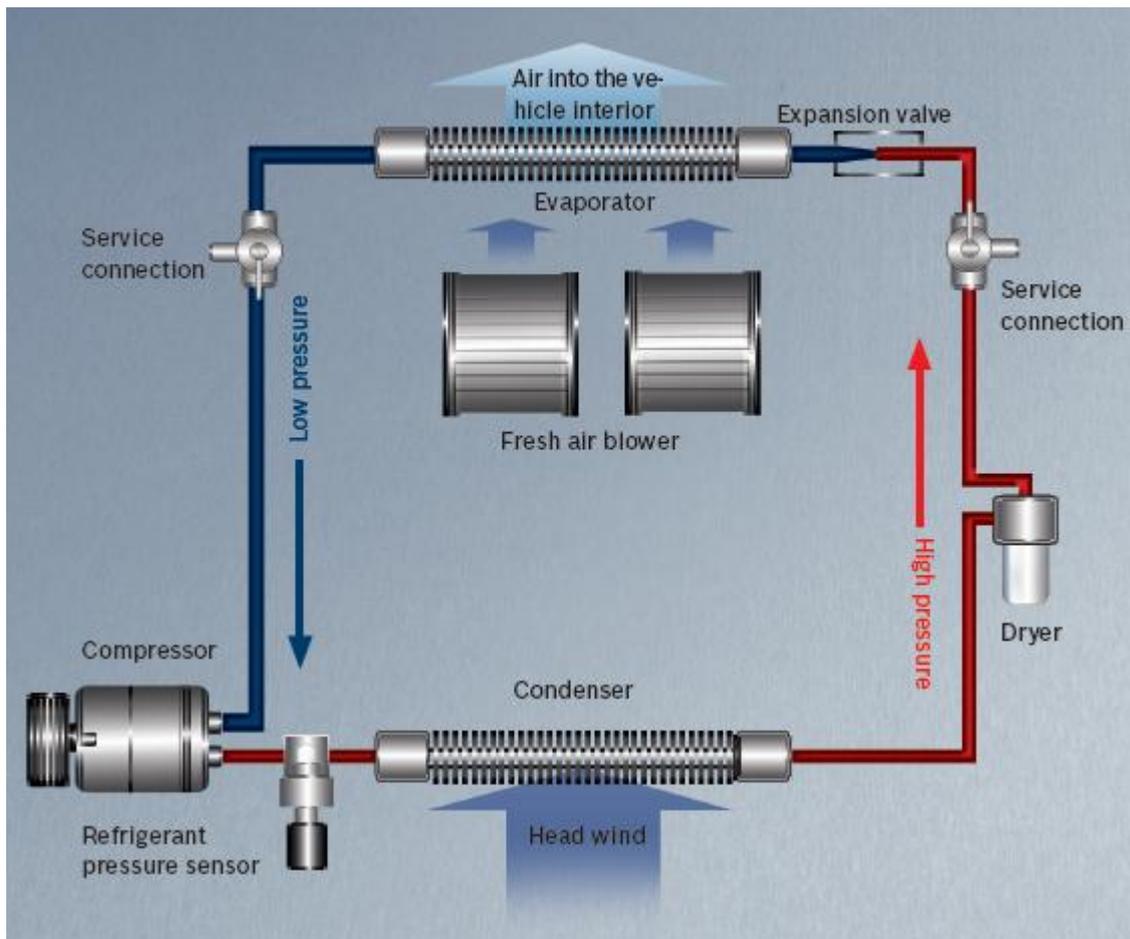
The compressor draws cold refrigerant gas out of the evaporator and pumps it into the condenser.

In the condenser the gas is cooled under pressure by the air stream and thus condenses.

In the dryer and accumulator the refrigerant is cleaned and dried.

The expansion valve injects the cleaned refrigerant into the evaporator.

The evaporator extracts the heat of evaporation required from the surrounding flow of air. This cools down on flowing through and is routed into the passenger compartment.



How an air conditioner works

If the air conditioner is switched in with the engine running, the compressor draws cold refrigerant gas out of the evaporator and pumps it into the condenser. On being compressed, the refrigerant heats up to roughly 60 – 100°C. The highly compressed hot gas is then cooled in the condenser by the ambient air flowing past (air stream or auxiliary blower). On reaching the pressure-dependent dew point, the refrigerant condenses and turns to liquid.

From the condenser, the fully liquefied refrigerant is conveyed into and collected in the receiver. Any water and contamination is filtered out as the refrigerant flows through the dryer.

From the receiver, the refrigerant is transferred to the expansion valve, where the highly pressurized liquid refrigerant is injected into the evaporator. The liquid refrigerant expands in the evaporator and evaporates. The heat of evaporation required is extracted from the air flowing past by way of the evaporator fins and the air cools down as a result. Following its return to a fully gaseous state, the refrigerant is drawn in and compressed again by the compressor.