# A/C compressor

The A/C compressor is the central element of a vehicle air conditioning system and is driven by the engine. It compresses the refrigerant in the refrigerant circuit of the air conditioner.

## Environmental protection

Today's chemical refrigerants for motor vehicle air conditioning systems belong to the group of partly fluorinated hydrocarbons (R134a) or (partially) halogenated alkanes (HFO-1234yf) and contribute to the greenhouse effect. When replacing the compressor and performing any other work on the air conditioning system care must therefore be taken to ensure that refrigerant is not allowed to escape into the environment. The refrigerant and the refrigerant oil removed must also be disposed of in the proper manner.

## Safety

The design of a refrigerant compressor means that it is only able to convey gases and vapours. As liquids cannot be compressed, they must never be allowed to enter the compression chamber. If this were to happen, it would have the following consequences:

- Damage to the valve plates and pistons
- Flushing-out of the lubricating oil film between piston and cylinder wall

This in turn would cause piston damage.

Damage to the A/C compressor affects the entire air conditioning system. If damage occurs, the first step is to establish the cause of compressor failure. It is advisable to start by checking whether the compressor shaft is turning or whether there is a problem with the magnetic clutch or overload safeguard. The following are also possible causes of compressor damage:

- Poor conveying of refrigerant as a result of incorrect control valve actuation
- Seizure of the compressor due to poor lubrication if viscosity is reduced for example by an excessive amount of UV contrast agent or the use of unsuitable universal oils
- Overheating of the compressor on account of insufficient refrigerant or compressor oil in the system

## Function

The compressor draws in the refrigerant gas from the evaporator. This in turn leads to a drop in pressure in the evaporator. The resultant lower pressure makes the refrigerant evaporate at low temperatures. The cold vapour is then compressed by the A/C compressor. The refrigerant gas warmed in the course

of compression is conveyed via pipes to the condenser, where it liquefies again, giving off heat in the process. It is then routed to the area to be cooled. Here, the refrigerant absorbs the heat of the air flowing into the passenger compartment and turns back into gas at the evaporator. It is then drawn in again by the compressor, where it is compressed.

The compressor is attached to the engine block and is driven by a pulley and a V-belt. When the air conditioning system is switched on, the belt drive is set in motion by a magnetic clutch. The compressors used in modern vehicle air conditioning systems are of compact, lightweight design. This was a prerequisite for the series installation of air conditioners in compact class cars.

## Depreciation

Regular expert servicing of the air conditioning system can help to prevent compressor damage. Should it nevertheless become necessary to replace the compressor, certain other steps also have to be taken. The following points must be heeded:

- The refrigerant circuit must be clean.
- The dryer or accumulator always has to be replaced as well.
- The expansion element must be checked for proper operation and replaced if necessary.
- The throttling valves also always have to be replaced.

Nissens

Delphi_EN

Magneti Marelli_EN

MAHLE

DENSO Aftermarket

Valeo_EN

HELLA

Source:
https://www.my-cardictionary.com/dictionary/air-conditioning-thermal-management/ac-compressor