Technical Bulletin

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TIPS & TRICKS

Compressors

Applications

All models equipped with A/C

Main functions of A/C compressor

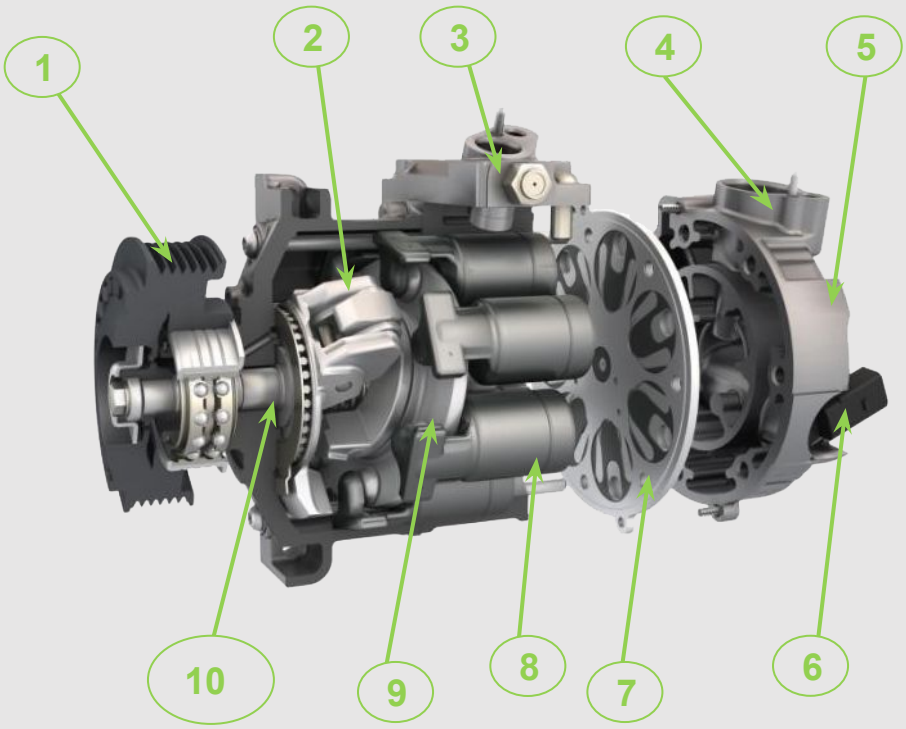
The compressor is the **main part** of the A/C system and provides **the flow** of the refrigerant throughout the system

Its main function:

- **Delivering** the **refrigerant** to all parts in system
- **Raising** the **pressure** of the refrigerant in the **gas phase**
- Allowing to **reduce** the **temperature** during the **cooling** at the condenser
- **Transporting oil** which slows down the **wear & tear** of the mechanical parts and **sealing** the system

Mechanical compressor structure

S	Name
1	Pulley
2	Rotating cam
3	High pressure pipe (outlet)
4	Low pressure pipe (inlet)
5	Casin
6	Clutch command
7	Intake and discharge valves
8	Piston
9	Plate
10	Shaft



Fixed capacity compressor type (Oscillant plate)

- **Shaft rotation** is converted into **piston translation** by means of a **slanted oscillating plate**
- The Slanted oscillating plate **maintains** its angle in **all conditions**, this cause a **drop of LP** resulting in a **stop** by the evaporator probe

Refrigerant sucked through LP pipe

Refrigerant exits through HP pipe

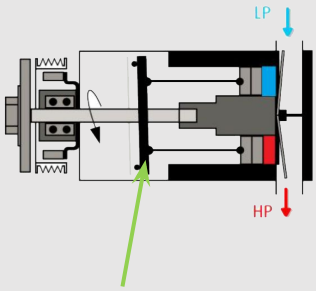
Variable capacity compressor type

Flow **regulation** is performed by changing the **travel** of the pistons by changing the **angle of the oscillating plate**, This variation is obtained by **modifying internal pressure** of th casing using the **internal valve** on the compressor

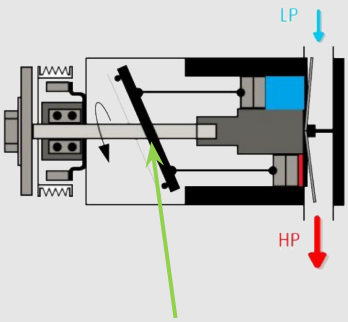
The **greater** need of **cold**, the **larger** the cylindrical capacity (**maximum plate angle**)

This type **offer** the following benefits

- **Reduced** vehicle **energy** consumption
- **No surge** when starting or stopping of A/C
- **Smooth change** in the car temperature



Min capacity



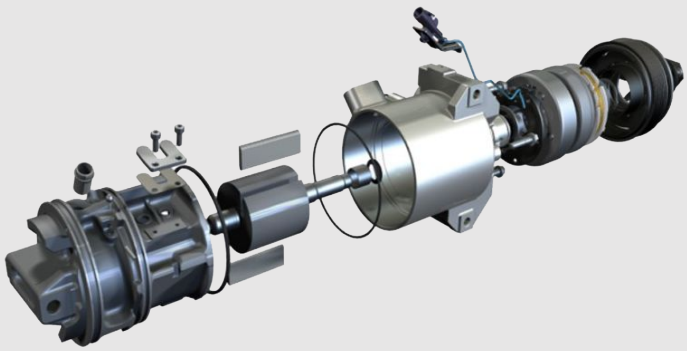
Max capacity

Valeo two-vane compressor

Two-vane compressor has simpler design, production & local purchasing become easier

This design offer the following benefits.

- **Simple** structure
- **Easily** machinable round cylinder
- **More** efficient A/C system with integrated oil separator
- Noise **reduction** due to positive displacement silencer

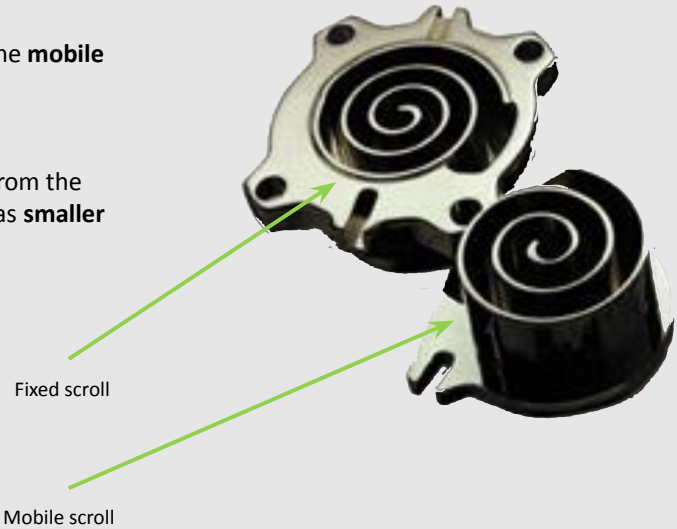


Four vane compressor type

- Made of cylindrical stator centered or counterblow rotor turns
- The latter is fitted with vanes which pushes the refrigerant from large volume into a smaller volume creating a compression
- Operation of vane compressor is based on the rotation of the rotor and reduction of the space available for the refrigerant trapped between vanes
- The volume of inlet gas is depend on the inlet port pipe opening variation
- The trapped gas is conveyed towards the outlet tube.

Scroll compressor type

- The compressor uses **two interlaced** scrolls, one **fixed** and one **mobile**
- The mobile scrolls is **connected** to the pulley
- The movement of the mobile scrolls **pushes** the refrigerant from the **large** occupation volume to the center of the scrolls which has **smaller** volume and thus creating a **compression**



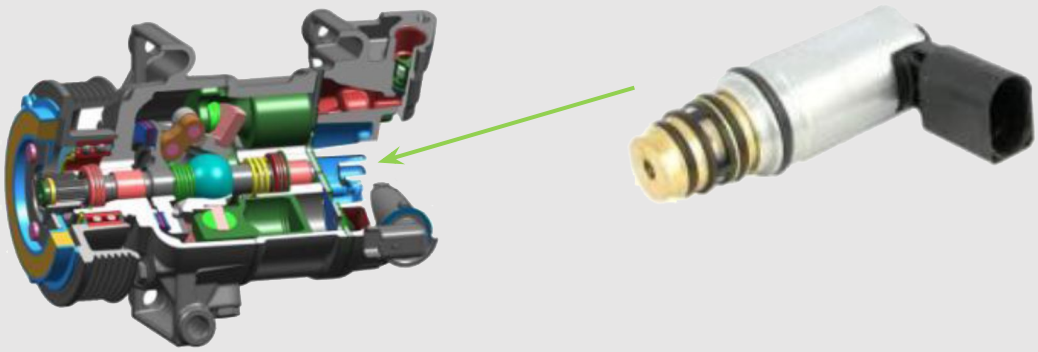
Mechanical valve

The mechanical valve has a precision diaphragm that senses low-side pressure

- When the cabin is **warm**:-
  - Evaporator temperature **increases**
  - **Increases** low-side pressure and **collapses** the diaphragm.
  - A port **opens** to vent housing pressure to the suction side of the compressor head
  - This **decrease** of **house pressure** and **increase** piston stroke,
  - Increasing refrigerant flow in system
- When the cabin is **cold**:
  - As evaporator temperature **decreases**, low-side pressure **decreases**
  - The diaphragm **expands** to **close** the **low-side** vent port and **open** a **port** for the high pressure into the housing
  - Higher pressure **reduces** piston stroke and refrigerant **flow volume**.

External electronic control valve

Electronic control valve **utilize** a solenoid and bypass channel in the **rear** of the compressor to **balance** the refrigerant pressure between the **discharge chamber** and **crankcase** to provide a swash plate angle from **3% to 100%** by using **PWM** signal from control unit



Electromagnetic clutch

Electromagnetic clutch consist of **3 parts**

- Magnetic coil
- Pulley
- Hub

The magnetic coil is mounted on the **front** of the compressor and **inside** the pulley

Clutch clamping is activated when an **electric current** runs through the coil, the current **attracts** it to the **armature plate** due to the **strong magnetic pull**