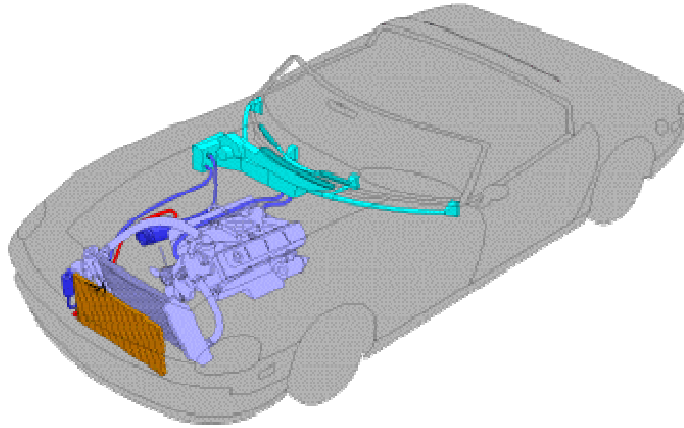


A/C And Heat Systems Overview



Below is an overview of this system's operation

The Air Conditioning and Heating System

Not only do we depend on our cars to get us where we want to go, we also depend on them to get us there without discomfort. We expect the heater to keep us warm when it's cold outside, and the air conditioning system to keep us cool when it's hot.

We get heat from the heater core, sort of a secondary radiator, which is part of the car's cooling system. We get air conditioning from the car's elaborate air conditioning system.

Despite its relatively small size, the cooling system has to deal with an enormous amount of heat to protect the engine from friction and the heat of combustion. The cooling system has to remove about 6,000 BTU of heat per minute. This is a lot more heat than we need to heat a large home in cold weather. It's good to know that some of this heat can be put to the useful purpose of keeping us warm.

Air conditioning makes driving much more comfortable in hot weather. Your car's air conditioner cleans and dehumidifies (removes excess moisture), the outside air entering your car. It also has the task of keeping the air at the temperature you select. These are all big jobs. How do our cars keep our "riding environment" the way we like it?

Most people think the air conditioning system's job is to add "cold" air to the interior of the car. Actually, there is no such thing as "cold," just an absence of heat, or less heat than our bodies are comfortable with. The job of the air conditioning system is really to "remove" the heat that makes us uncomfortable, and return the air to the car's interior in a "un-heated" condition. Air conditioning, or cooling, is really a process of removing heat from an object (like air).

A compressor circulates a liquid refrigerant called Refrigerant-12 (we tend to call it "Freon," a trade name, the way we call copy machines "Xerox" machines). The compressor moves the Refrigerant-12 from an evaporator, through a condenser and expansion valve, right back to the evaporator. The evaporator is right in front of a fan that pulls the hot, humid air out of the car's interior. The refrigerant makes the hot air's moisture condense into drops of water, removing the heat from the air. Once the water is removed, the "cool" air is sent back into the car's interior. Aaaaaah! Much better.

Sometimes we worry when we catch our car making a water puddle on the ground, but are relieved to discover that it's only water dripping from the air conditioning system's condenser (no color, no smell, and it dries!).

Note: Refrigerant-12 is extremely dangerous. Many special precautions must be taken when it is present. It can freeze whatever it contacts (including your eyes), it is heavier than air and can suffocate you, and it produces a poisonous gas when it comes in contact with an open flame.

Dash Controls

Most or all of the control panel of your car is located on the dashboard behind the steering wheel. Sometimes it extends onto the car's console, between the two front seats, and onto your steering column. Little duplicate fragments of the control panel are scattered around the interior of your vehicle, such as automatic door locks, extra light switches, etc.

The dash controls enable you to operate your headlights, turn signals, horn, windshield wipers, heater, defroster, air conditioning, radio, etc. All of the vehicle's controls should be within the reach of the driver.

The control panel also contains all of your gauges; gas, temperature, tachometer, etc. These enable you to monitor the operating conditions of your engine and charging system, fuel level, oil pressure and coolant temperature. Warning lights come on to alert you to dangerous coolant temperatures, or loss of oil pressure.

In 1924 the Nash Co. introduced the electric clock as an accessory.

Relays

A relay is an electromagnetic device in which contacts are made and subsequently broken. An example of this would be your car's horn.

By natural law, the farther electrical current travels, the lower its voltage becomes. Your car horn has to be connected to the car battery in order to sound. The shortest distance between two points is a wire connecting your horn to your battery. The only problem with this arrangement is that connecting the two would give you a permanent horn blast when you turned the key in your ignition.

This is an unacceptable arrangement, so a relay is included in the connection. The relay stops the horn from sounding until you activate the relay by pressing the horn. The relay then allows the horn to connect to the battery, or complete the circuit, and

it sounds. As soon as you stop pressing the horn, the relay breaks the connection, or circuit, and presto-- no more horn!

Relays, with switches, are used for most of the equipment that depends on the battery for an energy source. This includes headlights, taillights, radio, etc.

In 1922, a Model T was the first car equipped with a radio. In 1927, the first commercially produced car radio came on the scene.

A "relay" is any switching device operated by a low current circuit that controls opening and closing of another circuit of high current capacity. The purpose of the "cutout relay" is to prevent the battery from discharging through the generator when the engine is stopped or turning over slowly. A "field relay" connects the alternator field windings and voltage regulator windings directly to the battery.

Heater/AC Blower Motor

The blower motor is the motor that turns the electric fan in an air conditioning or heating system.

Air Ducts

The air ducts control the passage of hot or cold air into the interior of the car. They are operated by a control on the dash, either manually or automatically.

Controls

Most air conditioning/heating systems have three possible air settings. One is to recirculate the air that is in the car, a second is to use only air from the outside of the car, and a third is to mix some of the outside air with the air recirculating inside the car.

Low Pressure Line

The low pressure line is a hose, or tube containing refrigerant that connects the evaporator to the air conditioning system's compressor. The compressor draws the low pressure refrigerant from the evaporator in through the low pressure line in order to compress it.

High Pressure Line

The high pressure line is a hose, or tube containing refrigerant that connects the air conditioning system's compressor to the condenser. The compressor forces the compressed refrigerant into the condenser through the high pressure line.