



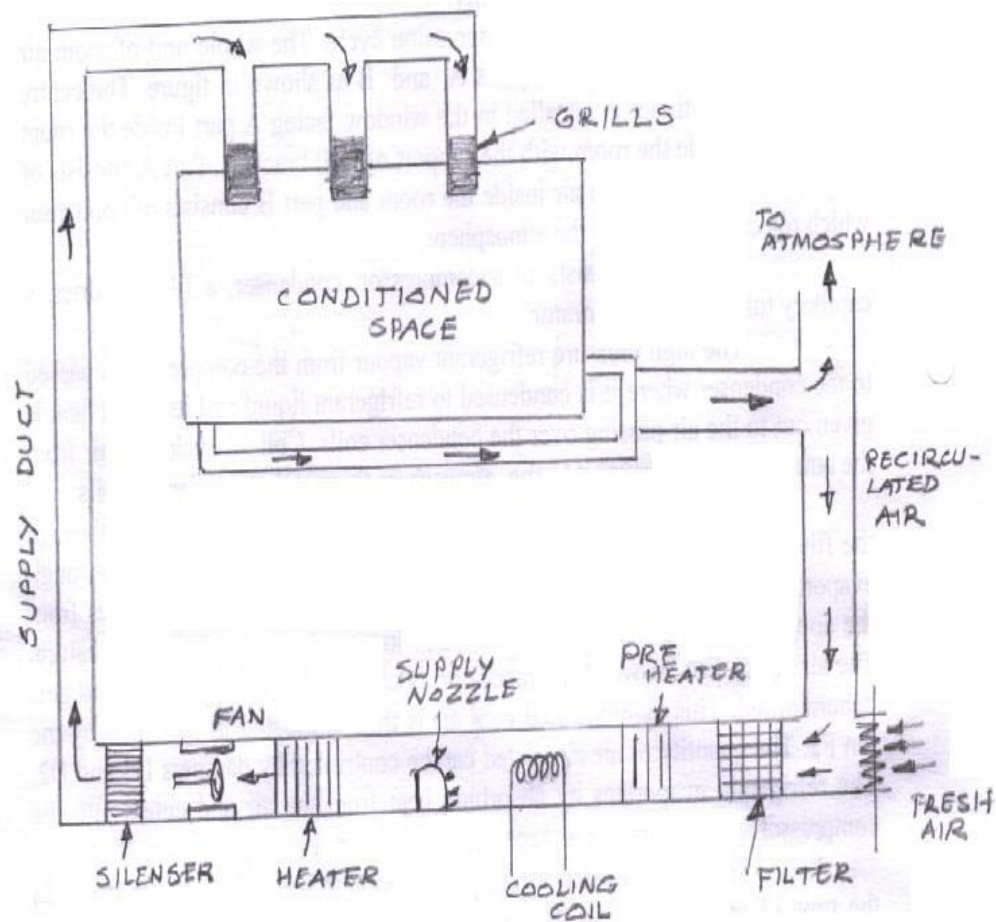
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Department of Mechanical Engineering Split Airconditioner



CENTRAL AIR
CONDITIONING

CENTRAL (SPLIT) AIR CONDITIONING PLANT:

In central air conditioning system, all the components of the system are grouped together as a single unit and installed in one central room. The conditioned air distribution from this center to the rooms to be air conditioned is done through the ducts provided. They are generally used for the load above 25 tonnes of refrigeration and 2500 m³/min of conditioned air.

The central air conditioning plant consists of the following components and they are assembled in one central room.

- 1.Filters:** To remove any dust particles and harmful bacterias.
- 2.Heating coils:** For winter air conditioning. They are supplied with steam or hot water.
- 3.Cooling coils:** For summer air conditioning. They are supplied with refrigerant or chilled water or brine solution.
- 4.Blower with motor.**
- 5.Sprays:** To cool and humidity air or to wash air.
- 6.A control device:** For operating the plant.

Working: The layout of a central air conditioning plant is shown in figure. The plant serves for both summer and winter air conditioning.

For summer air conditioning: Heating coil is made inoperative during summer. The outside fresh air along with recirculated air enters the plant through an air filter. It remove the dust particles and harmful bacterias from the air and prevents them from going into the air conditioned space. Then the air passes through the cooling coil.

The cooling coil is kept at a temperature below the dew point temperature of air. As a result, water vapour present in the air passing through the cooling coil gets condensed. Thus the air is dehumidified. The fan (blower) forces the conditioned air through the duct. This air passes through the duct and enters the rooms to be air conditioned through the grilled openings provided in the duct ways.

For winter air conditioning: During winter, cooling coil is made inoperative. The fresh air with recirculated air enters the plant through the filter for removal of dirt and impurities in the air. Then this air passes through the heating coils. The heating coil is operated to heat the air to the required temperature. The spray tube humidifier is also operated to humidify the air in dry seasons.

The conditioned air is then forced through the duct by the fan (blower). This air reaches the rooms to be air conditioned through the grilled

openings provided in the duct ways. The blower is driven by an electric motor through a belt drive.

Advantages of Unitary air conditioning system:

1. Installation charges and labour charges for assembly are less.
2. Duct work is eliminated.
3. Exact requirement for each room is achieved, due to individual control.
4. The units are kept running in the rooms only where the cooling is required.
5. If one unit fails, the air conditioning in other rooms are not affected.

Disadvantages of Unitary air conditioning system:

1. The initial cost and running cost per unit of refrigeration is more.
2. Noise and vibrations are produced.
3. Whole unit has to be removed for repairs and maintenance.

Advantages of Central air conditioning system:

1. The running cost per unit of refrigeration is less.
2. The central plant can be installed quite away from the rooms to be air conditioned.
3. Noise and vibration problems are not there since it is installed away from rooms.
4. Better accessibility for repair and maintenance.

Disadvantages of Central air conditioning system:

1. Installation and assembly, labour charges are more.
2. It requires duct system for air passing.
3. Even if one room requires air conditioning, the whole plant is to be operated.
4. Failure of plant affects the air conditioning of all rooms.