



Non-Central AC products

As seen in the tree diagram on page 11, the basic branches of airconditioning can be divided into Central Airconditioning systems and Non-Central airconditioning products. Let us first explore the branches under Non-Central AC products:

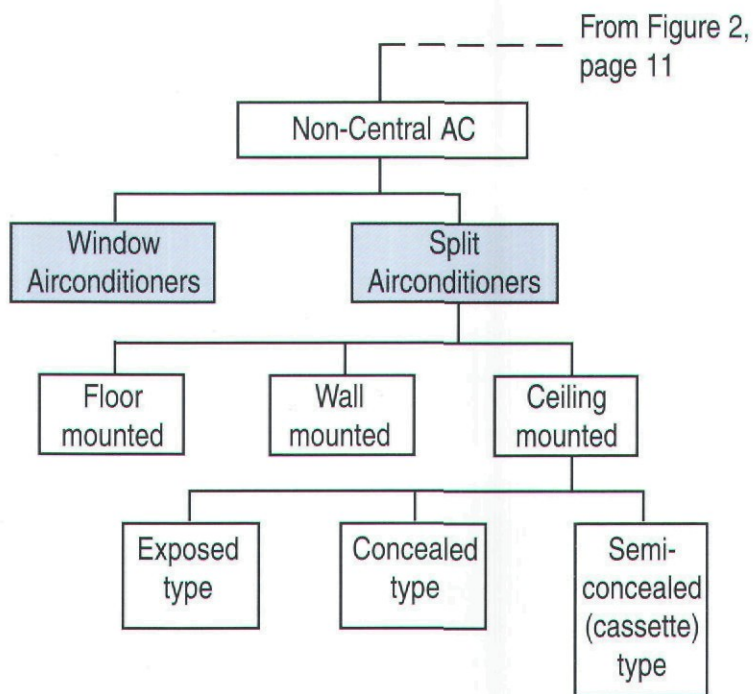


Fig. 3. Types of Non-Central AC products

Window Airconditioners

Room Airconditioners are familiar to most of us. These ubiquitous machines can be seen mounted in windows and therefore are also referred to as 'Window Airconditioners'. In Window Airconditioners, the compressor, condenser-fan, condenser and evaporator are all enclosed in a single cabinet. The unit is to be installed in a wooden frame either in a window or in a hole in the wall.

The air being blown through the condenser must pass freely through without restriction. We must therefore make sure that the condenser is not obstructed (for example by a neighbouring wall).

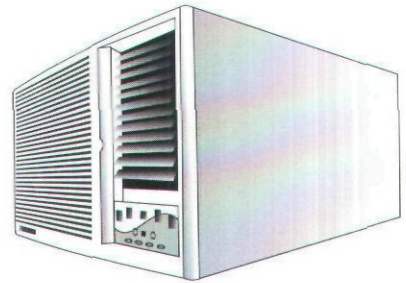


Fig. 4. Window-mounted Room Airconditioners

These airconditioners come in cooling capacities from 0.5 to 2 tons in various tonnages, adequate for a room between 5 and 20 square metres in size. Larger spaces may be handled by using multiple units of this type. While Window Airconditioners are economical and most convenient to install, they could be noisy for some applications.

Today, Window ACs offer a buyer various features. A discerning buyer will see through some of the claims as gimmicks and avoid them. However some features are certainly useful and reduce running costs.

The '**Sleep**' function is one such example. This is how it works, though the detail may vary from model to model.



Say, you set a desired room temperature of 22°C and switch your AC to 'Sleep' mode when you retire at night. After a few hours (say, 4), since the human metabolic rate drops and you really do not need your room to cool down to 22°C, your AC raises the 'set' temperature by 1°C to 23°C. The increment continues every hour for the next four hours or so. By early morning, the set temperature is a comfortable 26°C, which not only means you feel comfortable and not too cold, but you have saved electricity as well!

The '**Filter-clean reminder**' is another extremely useful feature.

Probably the single biggest reason for inefficiency in Window ACs is a dirty filter. Most of us ignore maintenance of the Window AC. Even if covered by maintenance contracts, dust is such a severe problem in most areas that the filter needs cleaning even between preventive maintenance visits by your supplier. Otherwise, the machine struggles to suck in air against a clogged filter resulting in increased power consumption and poor cooling.

A timely reminder by the AC, every so many hours of usage, helps the user to quickly clean the filter and restore the AC to its original efficiency.

Energy efficient compressor options are also certainly good to consider as we shall see in a later section on compressors.

Split Airconditioners

As the name implies, the Split Airconditioner is split into two basic components, the **Indoor unit** and the **Outdoor unit**. These two units are connected by refrigeration tubing and



electrical wires that can pass through a hole in the wall barely 10 cms in diameter.

The outdoor unit houses the compressor, condenser and the condenser fan. *The indoor unit* consists of the evaporator (cooling coil) and the evaporator blower. Since the noisier components are outside the building, the conditioned space is much quieter.

Though Split Airconditioners are more expensive than the Window Mounted type, they are preferred for their low noise levels.

There are also situations where it is not possible to mount a window airconditioner because of obstructions from neighbouring walls or non-availability of a suitable window. In such cases the Split Airconditioner is used because the outdoor unit can be mounted on the roof or on a ledge some distance away from the room to be airconditioned.

Types of Indoor Units

While the outdoor units of split airconditioners are all similar, indoor units are available in different types to suit the needs of the airconditioned space. **The types of indoor units are:**

Floor-mounted:

Such units are mounted on the floor, may be on a platform. Air throw is upwards.

Since floor-space is at a premium, and floor-mounted units occupy real-estate, such indoor units are not very widely used these days.

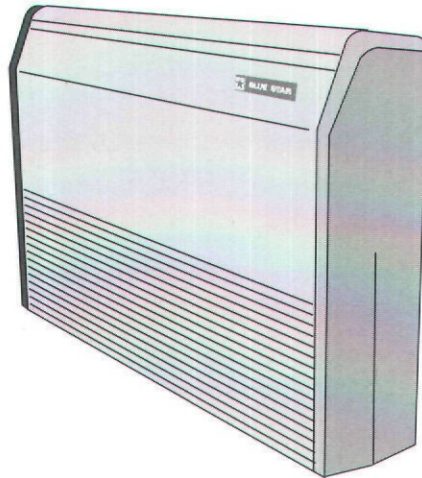


Fig. 5. Floor-mounted Split AC

High Wall Splits:

Such units are fixed on the wall, at a height of about 2.5 metres from the floor. The controls are generally operated either by a corded or cordless remote control unit. Because it is mounted on the wall it is preferred for rooms having less floor space. This model is widely used for domestic and commercial applications.

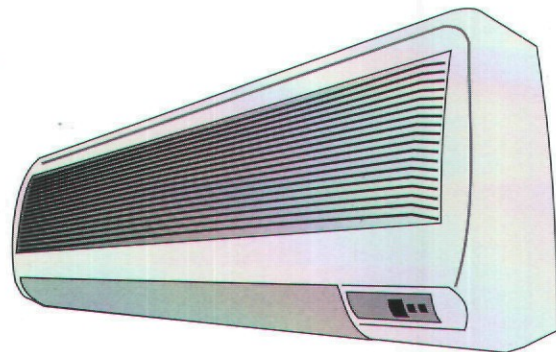


Fig. 6. High Wall Splits



Ceiling-mounted:

Ceiling mounted split airconditioners are designed to be suspended from the main ceiling. They are available in three models :

- (A) Exposed
- (B) Concealed
- (C) Semi concealed (cassette)

A. Exposed

These units are fixed directly to the ceiling and are visible. The unit is similar to the Floor mounted type. They are easy to mount and are preferred in commercial areas or offices that do not have a false ceiling.

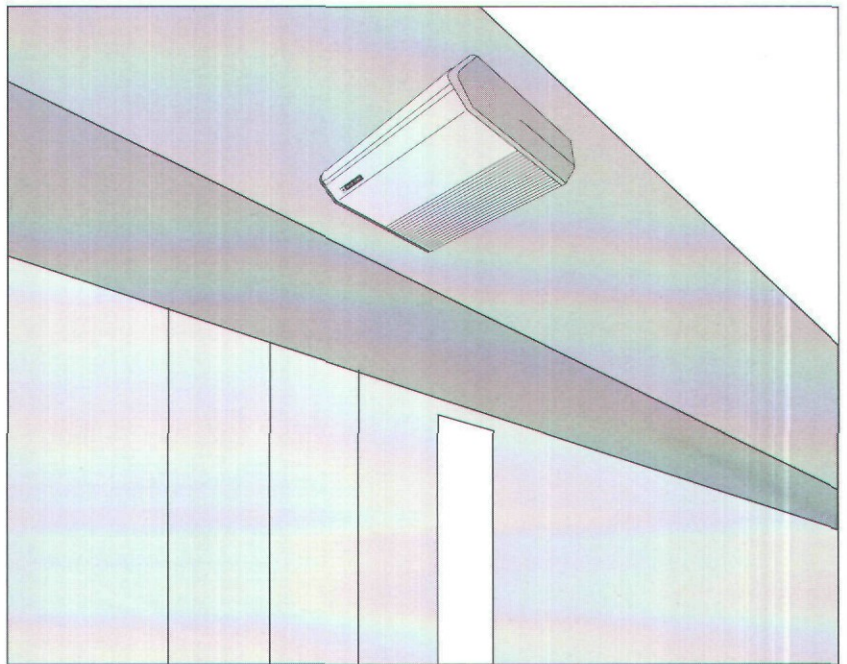


Fig. 7. Ceiling mounted (Exposed)



These days, ceiling-mounted (exposed) ACs are available in much larger tonnages (5 TR) to serve the cooling needs of larger halls and showrooms. Such units are called Turbo Splits.

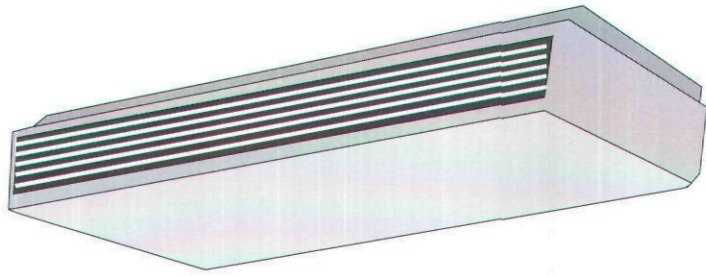


Fig. 8. Turbo Split AC.

B. Concealed

These units are also mounted on the ceiling but are designed to be hidden. They are generally concealed by a panelled box or false ceiling. These units are suitable for commercial areas where the interior design requires the airconditioning equipment to be concealed so as not to interfere with the aesthetics. You will find such units working in restaurants and offices.

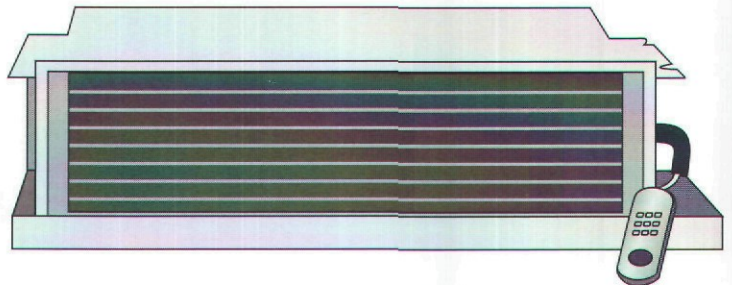


Fig. 9. Ceiling mounted (Concealed)



C. Cassette

Cassette type indoor units are mounted above the false ceiling in such a way that the outlet grill of the unit is flush with the bottom of the false ceiling. While the other types of indoor units provide for condensate draining by gravity the same is not possible for the cassette type.

To overcome this problem a small motorised pump is employed to drain out the condensate.

The cassette indoor unit is slim in height and therefore requires very little space above a false ceiling. In fact, the height of the beams that usually run across ceilings is enough for the cassette unit to sit comfortably beside.

The cassette also has the advantage that it can be placed directly above specific areas that require airconditioning. Multiple units can aircondition larger spaces.

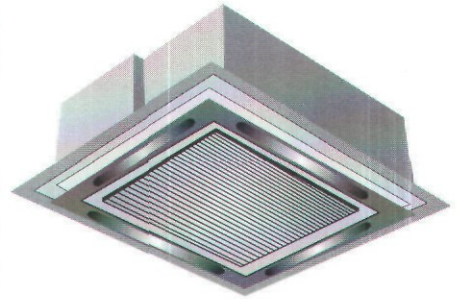
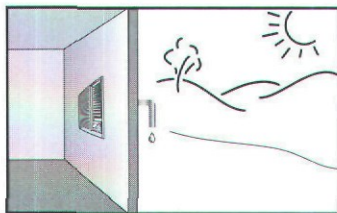


Fig. 10. Ceiling mounted (Cassette)



Condensate water...
draining is important

Drainage of condensate water

When the air around the evaporator is cooled, the moisture in the air accumulates as water under the evaporator. This happens because the cold air cannot hold as much water vapour as it held when it was warmer. You experience the same phenomenon when a small puddle of water accumulates under a chilled glass of water.

This water referred to as '**condensate**' is collected in a pan under the evaporator and must be removed from the conditioned space. Therefore, wherever indoor units are mounted, there must be a gently sloping drain tube to carry this condensate water away from the room. If the water is not drained properly it may collect in the drain pan until it overflows and drips into the room.

Electronic controls

Controls on all non-Central AC products – Window ACs and Mini-splits – are available from manufacturers these days either as conventional knobs-and-switches, or modern state-of-the-art electronic soft-touch buttons.

Electronic controls are further available both as corded control pads as well as cordless remote controls.

ACs with conventional controls are still cheaper in the marketplace than those with electronic controls, but the difference is narrowing. As the popularity of electronic controls increases, the price differential may vanish altogether, and soon it may well be curtains on conventional controls!



The reasons are not far to seek. Electronic controls are:

- Precise and accurate. Hence you can set room temperatures more accurately, contributing to better comfort levels.
- Active contributors to energy-efficiency of the AC. Not only do they ensure switching on/off of the compressor at precise set temperatures, but they also prevent electrical connectivity losses.
- More reliable than conventional knobs and switches.
- Sleeker and more aesthetically appealing.

Even amongst electronic controls, the cordless remote control is gaining in popularity vis-à-vis the corded control pad. What was once perceived as a luxury for the upper classes, is today virtually common-place.

For one, prices of ACs with cordless remote control are not much higher than those with corded controls. Secondly, remote control units can increase the energy-efficiency of an AC simply by overcoming lethargy to move to the unit to raise the 'set' temperature or to switch off the unit!



Applications for Non-Central AC products

In summary, non-Central Plant AC products are:

- Window ACs
- Floor-mounted splits
- High wall splits
- Ceiling-mounted (exposed) splits
- Ceiling-mounted (concealed) splits
- Ceiling-mounted (semi-concealed, or Cassette) splits

Different applications need different cooling solutions, and that is why there are such a variety of products to achieve the same goal. Let us look at some typical applications of the above products.

Window ACs

Window ACs can be characterised by the following positive and negative features :

Positives:

- Inexpensive
- Easy to install
- Each room can operate its AC independently
- Simple, low-cost, service and maintenance
- Running costs are low



Negatives:

- Tonnages are limited (1 to 2 TR typically)
- Noisier (than other types of ACs)
- A window is required, and blocked, by the AC
- No constant fresh air circulation

Keeping the above attributes in view, Window ACs are useful in:

- Homes
- Small office executive cabins
- Small shops.

Why?

- Homes and small offices generally use ACs as unitary (independent) products to cool separate rooms
- Tonnage requirement per room is limited typically to 1-2 TR
- Budgets are usually tight

Window ACs, therefore, fit the bill as the most preferred product in these applications. Noise and lack of fresh air do pose problems, but these factors are not perceived as critical in these segments, while choosing an AC.

However, even amongst Window ACs, the buyer may be encouraged these days to buy less noisy, more efficient Window ACs at incremental costs. Certainly, many of the 'optional' features offered on Window ACs these days by manufacturers are worth the initial extra in the long run.



Some of these options are :

- **Rotary compressors.** Less noisy and more efficient.
- **Electronic thermostats.** Switch the AC on and off more precisely, saving power and cooling to the right temperature.
- **Remote controls.** Allow you to control your AC from where you are (in bed or at your work-table), thus allowing constant control and increased efficiency.
- **Sleep function.** Saves power and provides better comfort.

Mini-split ACs

All mini-split ACs (whether floor-, wall- or ceiling-mounted) may be characterised by the following positives and negatives:

Positives:

- Quieter than Window ACs
- Available in larger tonnages (even upto 5 TR in Turbo Splits)
- Do not require, or block, a window
- May be used as 'multiple' units to cool 2 or 3 adjacent rooms
- May suit the interiors better
- May be found aesthetically better suited

Negatives:

- Costlier than Window ACs
- Require space outside the room for the outdoor unit



- Some piping and cabling necessary
- Do not provide for fresh air intake

Keeping the above attributes in view, Split ACs are useful in:

- Senior executive cabins
- Professionally positioned small or mid-sized showrooms
- Up-market homes
- Small clinics, ATMs, etc.

Why?

- Such applications place a premium on 'quiet' cooling
- Windows unlikely to be available for Window ACs
- Fresh air may not be a problem, due to constant opening and closing of doors
- Budgets allow mini-split purchase
- May suit aesthetics/interiors/status better than Window ACs

Professionally run, mid-sized commercial spaces cannot tolerate even the noise of the quietest Window AC interfering with their client's feel of comfort. Besides, most such commercial structures are unlikely to have convenient windows for use of Window ACs.

The constant opening and closing of doors make fresh air addition a happy corollary in small commercial establishments. Hence, that does not pose a problem here. Larger spaces will of course require planned injection of fresh air, which we shall study later when we look at Central AC systems.



Choice of IDU

Among Mini-splits, of course, there are a variety of indoor units available. The choice of indoor unit (IDU) would again depend on application.

Homes that use mini-splits to cool large living rooms or bedrooms may prefer high-wall IDUs or floor-mounted units because both are:

- Easy to install and maintain.
- Do not require false ceiling work.

Showrooms on the other hand may prefer the semi-concealed (cassette) or concealed (hideaway) ceiling-mounted IDUs, since:

- They are tucked away on the ceiling and do not eat up precious showroom wall space.
- Neither IDU demands too much by way of false ceiling work. Just the space around the unit really needs aesthetic cover.
- Both are slim in height and require just a little space between false and real ceiling.

Larger single-hall showrooms may find the 'turbo split' ceiling-mounted IDU most suitable.

The cassette IDU can also be an ideal alternative in some other situations like:

- In larger spaces where the ceiling is criss-crossed by beams, and ducts are difficult to run
- Where ceiling height is low, since the cassette is slim in height



- When air throw must be directed over specific areas of the room that wall-mounted or floor-mounted units may not reach.

Like wall-mounted units, cassettes are also available in 'multiple' units, so larger areas may be cooled using multi-cassette systems.

Small offices may use any of the available options depending on décor and availability of space.