

An air conditioner controls and regulates humidity and temperature; and filters, cleans and re-circulates the air within the house. A unit that is too small will run continuously without sufficiently cooling the area. A unit that is too large will cool the area quickly and shut off before sufficiently removing moisture from the air. A ton air conditioner is required for every 300 to 550 square feet in sub-tropical climates (Florida) and 750 to 1,000 square feet in northern climates (Ontario) and will provide 12,000 BTUs (British Thermal Units) of cooling in an hour. Capacity can be determined by its full load amperage (FLA) or rated load amperage RLA. There are about 7 amps per ton of cooling. Thus a unit with an RLA of 27 is approximately 4 tons.

EVAPORATIVE or "swamp coolers" are typically used in dry desert regions. The unit is mounted on the roof or beside the house. Inside the unit water is sprayed on a sponge-like blanket, then hot outside air is pulled through the blankets by a blower causing the water to evaporate and cool the air. The cool air enters the house, forcing hot stale air through open windows.

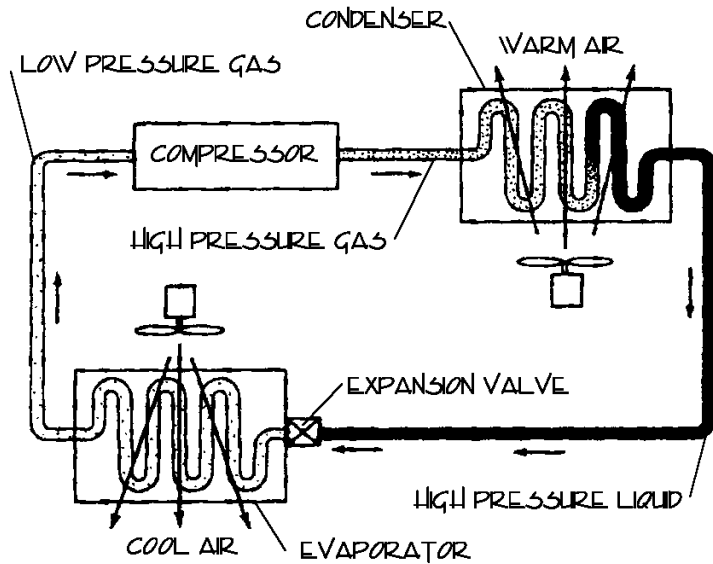
- **CLEAN EVAPORATIVE UNIT AND REPLACE THE BLANKET EACH SEASON TO PREVENT BACTERIA BUILDUP**

REFRIGERATED systems simply absorb heat from air within the house and transfer it to the outside. The system contains liquid refrigerant that is forced through a nozzle causing it to expand into a gas. The gas flows through the evaporator coils, cooling the coils and extracting heat and moisture from the room air. Then the warm gas flows into the compressor and is heated by compression. The hot gases then enter the condenser where the coils dissipate heat to the outside. From this the gas turns into a liquid ready to repeat the cycle. The condenser tray catches the moisture and discharges the condensate to the exterior or a waste drain, floor drain, sink, waste pipe or through the foundation wall. Occasionally, the condensate is discharged into a lift pump. This pump lifts the condensate to a level where it can flow to any location.

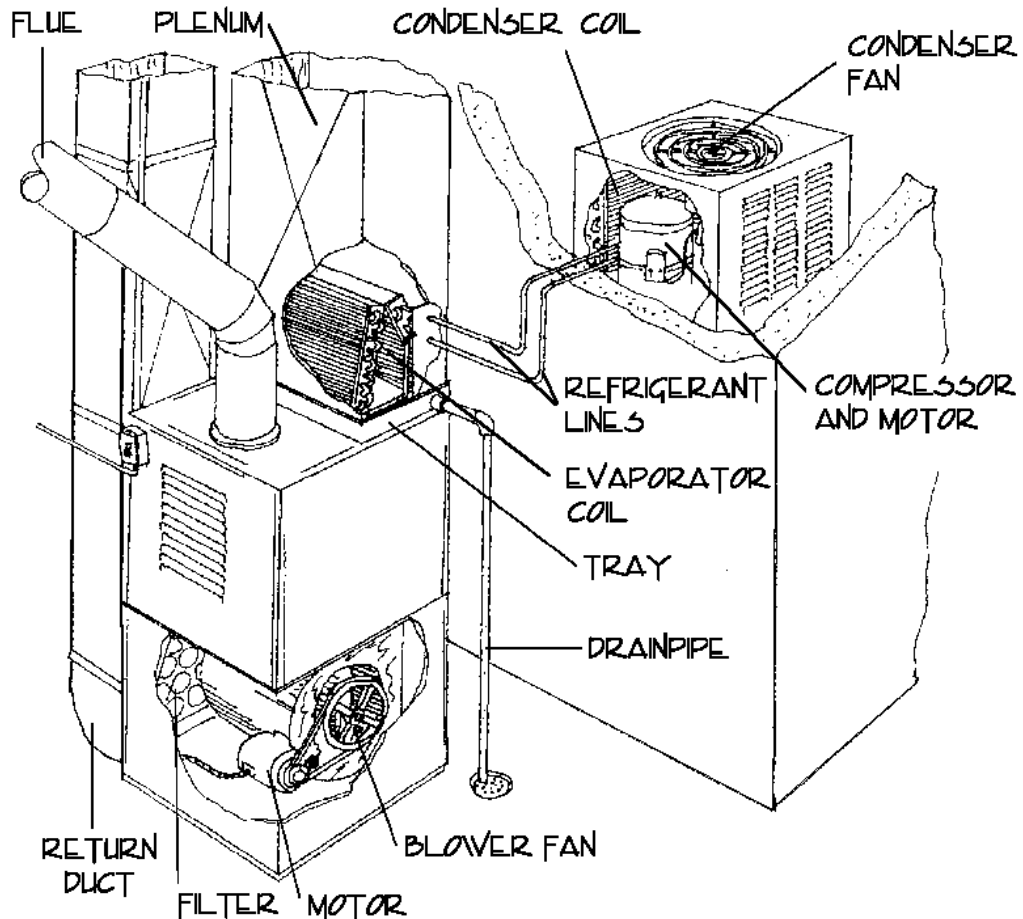
An **INTEGRAL**, or *self contained* system, has all the components encased in a single unit. This unit can be located in the attic or crawlspace with ducts through the exterior wall to provide air for cooling the condenser. In a **split system**, the compressor-condenser is located outside and the evaporator coils are located in the house either in the attic or inside the warm-air plenum of the furnace. The compressor-condenser is connected to the evaporator by two copper pipes - the smaller pipe is the liquid line which carries the high-pressure liquid refrigerant from the condenser to the expansion valve. The larger pipe or suction line (which should be insulated), carries low-pressure gas from the evaporator coils to the compressor. The **air differential** - room air and the output air - should be between **12° F to 22° F**. A high split may indicate inadequate air flow, clogged evaporator coil, high fan speed, restricted ducts or dirty blower fan blades.

MAINTENANCE ITEMS :

- **DO NOT OPERATE THE SYSTEM AT TEMPERATURES BELOW 60° F**
- **DO NOT OPERATE UNLESS THE COMPRESSOR HAS HAD POWER FOR AT LEAST 24 HOURS**
- **DO NOT LOCATE THE CONDENSER COILS IN DIRECT SUNLIGHT**
- **CLEAN THE CONDENSER COILS AT LEAST ONCE A SEASON**
- **THE UNIT SHOULD BE PLACED ON A LEVEL SLAB ON GRADE OR MOUNTED LEVEL ON THE OUTSIDE WALL**
- **THERE SHOULD BE A CLEARANCE OF 54 INCHES ABOVE AND 15 INCHES ON ALL SIDES OF THE OUTSIDE UNIT CLEAN THE AIR FILTER EVERY MONTH DURING THE COOLING SEASON**
- **THE CONDENSATE DRAIN SHOULD HAVE A U-SHAPED TRAP (ESPECIALLY IF CONNECTED DIRECTLY TO A WASTE PIPE OR FLOOR DRAIN)**
- **IF ACCESSIBLE, VACUUM AND CLEAN THE EVAPORATOR COILS - ITS A BREEDING GROUND FOR BACTERIA**
- **SIGNS OF RUST AND MINERAL DEPOSITS AROUND THE PLENUM MAY INDICATE A CLOGGED CONDENSATE TRAY DRAIN OR FAULTY INSTALLATION**
- **FROST ON A LOW-PRESSURE LINE INDICATES A DEFICIENCY IN REFRIGERANT OR DIRTY EVAPORATOR COILS OR INSUFFICIENT AIR FLOW THROUGH THE EVAPORATOR**



Schematic of a typical air conditioner



Typical split air conditioning system