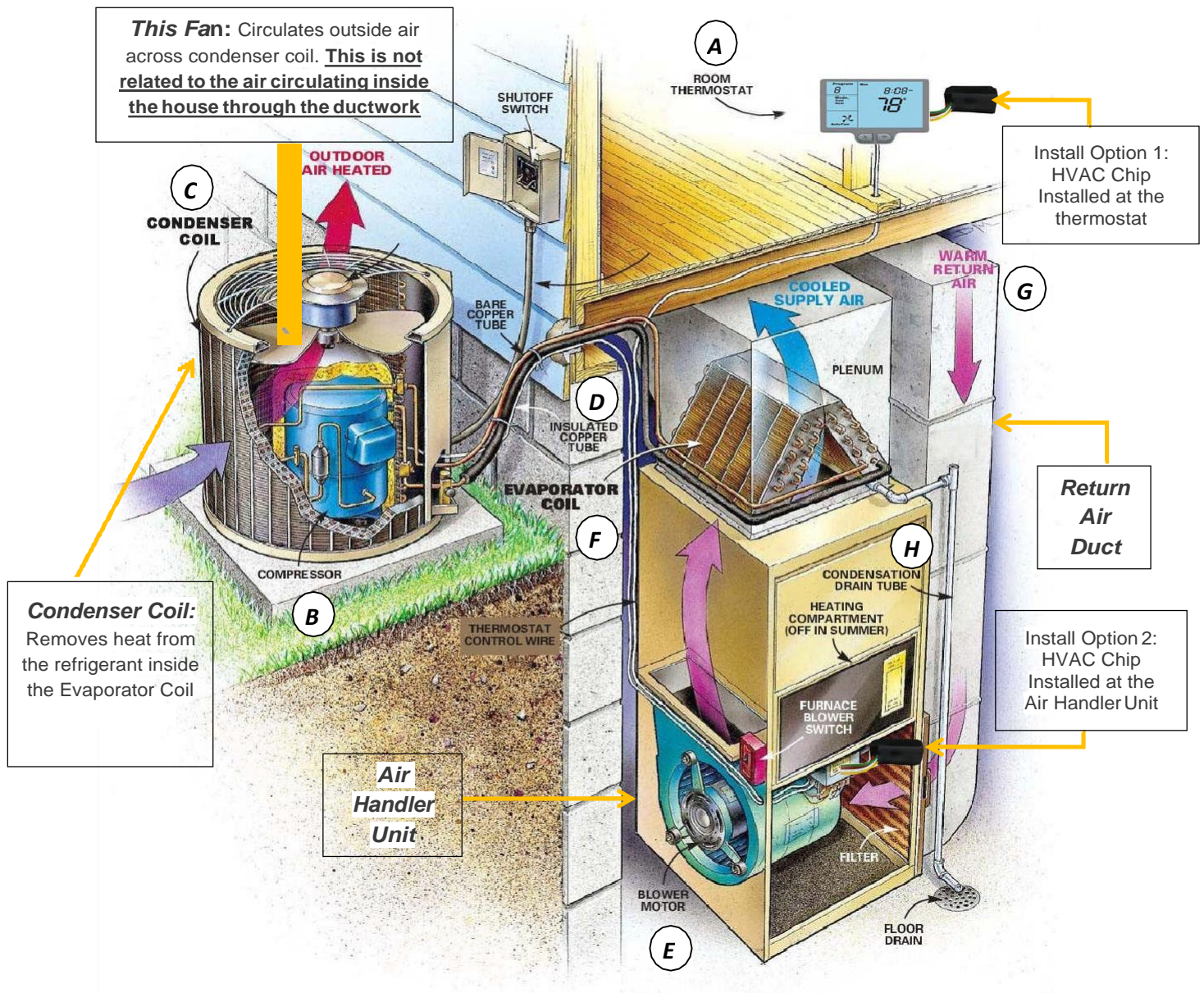


CWS HVAC Chip APPLICATION NOTE.

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Using CWS HVAC-Chip SFT (Smart Fan Technology) in Humid Regions.



The above picture shows a typical HVAC system used in the United States, Canada, Mexico and other parts of the world where a central **Room Thermostat (A)** - top right in picture above) is used to detect the room air temperature and turn the HVAC system based on temperature settings.

During the summer, the thermostat will turn the air conditioner **Compressor (B)** (left in the above picture) on and off. This compressor is typically mounted outside the building. The **Condenser Coil (C)** (left in the above picture) in the compressor cools the refrigerant or cooling liquid piped into the building (**D** - see **Insulated Copper Tube** in the picture) where the **Air Handler Unit** is located (see bottom right in the picture).

The Air Handler Unit is also the best location to install the HVAC Chip. The HVAC Chip is installed at the terminal block of the Air Handler Unit PC board.

The air handler unit has a blower **Motor (E)** (see lower bottom right in the picture) that moves air through the ductwork across the **Evaporator or Cooling Coil (F)** (see middle right in the picture). This process cools the air and sends desired spaces.

The HVAC Chip extends this blower Motor (E) run time after the Compressor (B) has cycled down. This allows otherwise wasted energy in the condenser coils to cool additional air to be pushed into the rooms. Note that the HVAC-chip does not affect the Compressor (B) fan operation. When the Compressor shuts off, this fan shuts down completely as well and will not be turned on again until the Compressor turns on.

The HVAC Chip can be installed EITHER at the thermostat OR at the Air Handler Unit PC Board. Please see installation instructions for more details.

The above picture shows the **Warm Return Air (G)** being blown into the Cooling Coils (F) of the air handler unit. This process cools and dehumidifies simultaneously.

In a hot humid region, a conventional air conditioner system works by drawing hot, humid air from throughout the house into the return ductwork, cooling and dehumidifying. It then returns reconditioned air into the room. The newly cooled and dehumidified air is much more comfortable.

Residential Central air conditioning units can be split, meaning there is a condenser/compressor unit outside and an evaporative unit or cooling coil inside, usually mounted on the furnace or at the air handler unit.

Commercial HVAC usually comes as a Roof Top Unit (RTU). The compressor and evaporator cooling coil are packaged in a single unit mounted on the roof top outside the building.

HVAC units may also be Ductless Central Air Conditioning Units and are often referred to as mini-split systems. They work by using an outdoor compressor that serves as an individual unit. It has an evaporator cooling coil and blower fan combination that is usually placed on the upper half of room walls. A small drain pipe directs condensed water to the outside. These units are large but relatively unobtrusive. It is often more expensive than a conventional unit but homeowners can save a lot of money by not having the home fitted with ductwork. As opposed to window units, a ductless system is quieter, doesn't block the view and can also provide heat.

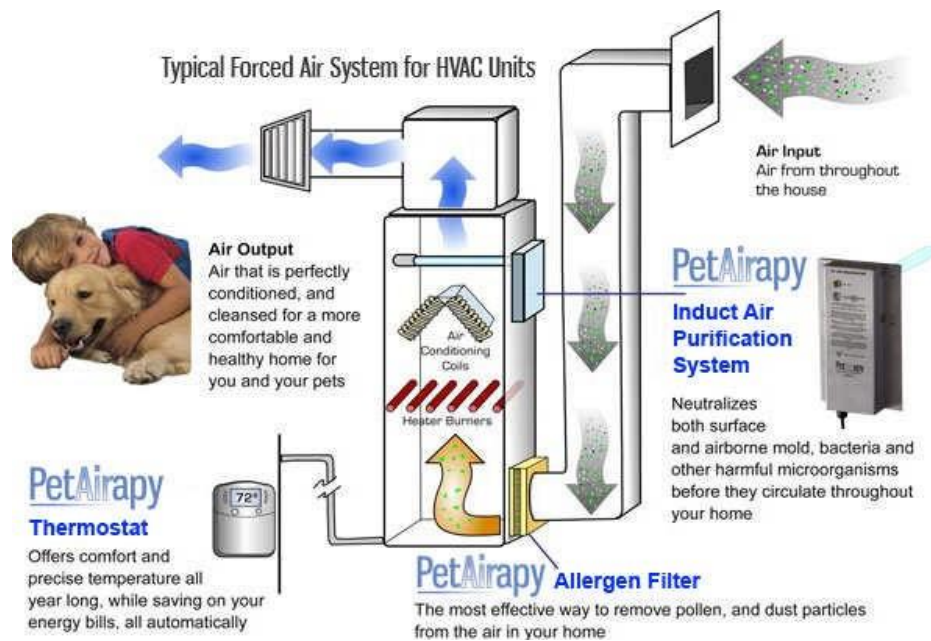
A Residential Central HVAC Unit is usually a closed system. A closed system means the same air is being recirculated in the room through the ductwork and no outside air is drawn into the rooms. During the hot, humid summer, the Intake air or the warm return air is taken from rooms inside the building and air output or cooled supply air goes back into the same rooms.

No hot, humid air is piped or introduced into the ductwork unless outside air that gets in through open windows and doors.

In a hot humid region, when the air conditioner is turned on, the humidity of the air in the room condensates onto the evaporative cooling coil. This is a part of the cooling and dehumidifying process. The water that is extracted from the humid air as it cools is drained to the outside. See the **Condensation Drainage Pipe (H)** - see picture lower right). Humidity is kept at relatively low levels even after the air conditioner rests as no fresh humid air enters into the ducts.

When the building owner installs the HVAC-chip, the extend fan run time will evaporate away the small amount of condensed water still left in the Evaporator Cooling Coil (F), and blows the residual cool air into the rooms. The small amount of condensed water left in the evaporator cooling coil will NOT make the room air more humid or as humid as the outside air since no new fresh humid air is introduced by extending the fan run time. This is a closed system. The air in the rooms and in the ducting has been dehumidified. Humidity in the air has already been extracted and drains out as water into the floor drain. The water extracted during dehumidifying is not re-introduced into the system when the Compressor (B) rests and the HVAC-chip extends the Blower Motor (E) run time. This reasoning applies to both Extended Fan Efficiency (EFE) and Compressor Rest (CR).

EFE + CR = SFT (Smart Fan Technology)



The picture above shows a typical central HVAC system showing a closed loop system. Note that the majority of residential central HVAC system is using a closed loop system.

During summer, **the Air Input or the warm return air is taken from rooms inside the building and Air Output or cooled supply air goes to the rooms inside the building as well.**

In most HVAC system, when the Compressor (B) shuts down and if the blower motor (E) is kept running, there is no humid air being blown into the rooms. Many HVAC contractors are mistaken by thinking that the additional blower run time will introduce humidity into the rooms in the humid regions like Florida.

This is because many wrongly believe that the AIR INPUT or the INLET AIR is taken from outside the building or from outside the house. This is NOT correct. The Inlet air into the ducts is taken from INSIDE the rooms of the building that has already been dehumidified as it gets cooled down and when the inside the room air temperature rises, the humidity does not go up significantly.

In very large industrial buildings that houses lots of people, there is a fresh air vane that allows some mixing of outside air with the inside room air in the ducting. This vane opening is set by the HVAC electricians or sometimes set automatically through a central control.

Even in such as case, the amount of humidity introduced into the ducts is limited by the openings of these vanes which are usually fairly small. In almost all home based HVAC system, a closed system is used and the inlet air is not mixed with fresh outside air and therefore, no humid air is blowing back into the room when the HVAC-chip is used.