

# **OWNER'S MANUAL**

## **HEAT PUMP AND AIR CONDITIONER**

DATE: 08-05-94

MANUAL 2100-034 REV. C  
SUPERSEDES REV. B  
FILE VOL. I, TAB 6

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## GENERAL INFORMATION

These instructions have been prepared to acquaint you with the unit's care and operation in order that you may enjoy many years of comfort from your new air conditioning or heat pump system. It will give you all the comforts of complete air conditioning--temperature control, dehumidification, circulation, and filtering--you have complete control, yet the unit is as automatic as you desire.

In this pamphlet we have put together the basic principles of our Heat Pumps and Air Conditioners that we feel each owner should know. It also contains hints which might help you to save money in the future.

These instructions are important...and there are not many of them. Your unit is a modern air-cooled design which combines simplicity with maximum trouble-free performance. But, like changing the oil in your car...or not racing the engine when it's cold...there are a few do's and don't's for air conditioners and heat pumps as well. So please take a few minutes now and familiarize yourself with the contents of this booklet and keep it handy for future reference.

## GOOD AIR CONDITIONING PRACTICES

### KEEP FILTERS CLEAN

This is "your" most important responsibility. A dirty, clogged filter reduces the efficiency of your system, causes erratic performance of controls and can result in damage to the motor, heating element, or to the compressor. REPLACE OR CLEAN FILTER AT THE BEGINNING OF EACH SEASON AND THEREAFTER AS NEEDED. On new homes, check filter every week for four weeks to begin with. Sawdust and insulation may be unavoidably introduced into the duct during installation.

In all cases, inspect your filters at least once a month when the system is in constant operation--replace as needed with the same size and type as removed from the unit. Dirty filters "CHOKE" the airflow to a point where the system cannot do an efficient job. The unit must then run longer to maintain the temperature you have set on the thermostat. This increases your operating costs.

NOTE: Do not operate heat pump or air conditioner with the blower door removed, or the filter access door off.

### KEEP THE OUTDOOR COIL CLEAN

Have your dealer show you where the outdoor coil is on your air conditioner or heat pump. When the unit is cooling in the summer, this coil does the same job as your car radiator...it dissipates the heat which was absorbed by the cooling system. On heat pump models which provide heating in the winter, this outdoor coil absorbs heat from the outside air. Like your car radiator, this coil doesn't work as well when clogged with windblown leaves, papers or foreign debris. A periodic check will save money on operating costs!

Efficient operation of the heat pump depends on free circulation of air over the indoor and outdoor coils. At no time should anything be stacked against the sides of the outdoor unit nor should anything ever be draped over it, summer or winter. DO NOT plant flowers, vines or shrubbery too near the unit. These will just as effectively block air flow as will stacking things against it. Do not worry about rain falling into the unit...it was designed and manufactured for outdoor use.

In areas of heavy snow accumulation, snow should not be permitted to bank up against the sides of the outdoor unit. The most frequent cause of restricted outdoor coil airflow is the build-up of snow and ice resulting from severe weather conditions. As soon as practical after such inclement weather, you should clear the snow and ice from the area around the unit and as much as possible from the wire grilles on the unit.



## KEEP WINDOWS AND DOORS CLOSED AS MUCH AS POSSIBLE

Normal air leakage through window sashes, door jambs and other points will provide a sufficient rate of fresh air intake. When you leave doors and windows open, you increase the work load on your air conditioner or heat pump. This results in higher operating costs.

## DURING THE SUMMER, USE YOUR WINDOWS AND SHADES TO KEEP OUT DIRECT SUNLIGHT

Why does a greenhouse stay "warm" during the winter? Because the glass construction allows the sun's rays to enter and heat the inside. The glass areas of your building are no different. Every bit of sunlight that enters, tends to increase the temperature and, thus, increase the work load on your unit during the cooling season.

## A WORD ABOUT SUMMER HUMIDITY

"It isn't the heat...it's the humidity!" How often have you heard that statement? There is a lot of truth in it, so here are a few tips about the moisture in the air which causes that muggy, "close" feeling.

Your unit is designed to do more than cool the air. During the summer, it also removes excess moisture and keeps the humidity down to a comfortable level. It may surprise you to know that an air conditioner "works harder" when removing moisture than when simply cooling the air. Consequently, any steps you take to reduce the moisture load will mean money saved in operating costs. Rooms which have moisture-producing items...(examples are clothes dryers, steam tables, etc.) should be vented to the outside with exhaust fans when in use. This will prevent excess accumulation of moisture in other living spaces...moisture which your unit must remove when cooling your building.

## EQUIPMENT PROTECTION IN A CORROSIVE ENVIRONMENT

The metal parts of this unit may be subject to rust or deterioration if exposed to a corrosive environment. This oxidation could shorten the equipment's useful life. Corrosive elements include salt spray, fog or mist in seacoast areas, sulphur or chlorine from lawn watering systems, and various chemical contaminants from industries such as paper mills and petroleum refineries.

If the unit is to be installed in an area where contaminants are likely to be a problem, special attention should be given to the equipment location and exposure.

1. Avoid having lawn sprinkler heads spray directly on the unit cabinet.
2. In coastal areas locate the unit on the side of the building away from the waterfront.
3. Shielding provided by a fence or shrubs may give some protection.
4. Elevating the unit off its slab or base enough to allow air circulation will help avoid holding water against the basepan.

Regular maintenance will reduce the buildup of contaminants and help to protect the unit's finish.

**WARNING: DISCONNECT ALL POWER TO UNIT BEFORE STARTING MAINTENANCE.**

1. Frequent washing of the cabinet, fan blade and coil with fresh water will remove most of the salt or other contaminants that build up on the unit.
2. Regular cleaning and waxing of the cabinet with a good automobile polish will provide some protection.

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3. A good liquid cleaner may be used several times a year to remove matter that will not wash off with water.

Several different types of protective coatings are offered in some areas. These coatings may provide some benefit, but the effectiveness of such coating materials cannot be verified by the equipment manufacturer.

The best protection is frequent cleaning and maintenance and protection from exposure to contaminants.

## BASIC OPERATING PRINCIPLES

### COOLING--SUMMER OPERATION (Air Conditioner and Heat Pump)

The cooling system operates similarly to your refrigerator. There are three main parts: (1) The evaporator coil where cold refrigerant absorbs heat from the air which circulates through the duct system in your home; (2) the condenser coil, outdoors, where the heat which was absorbed indoors is discharged from the refrigerant; and (3) the compressor which is a pump that moves the refrigerant through the system.

An air conditioner cannot cool a house off rapidly. It pulls the temperature down slowly. Therefore, do not turn the unit on and expect immediate action. It may take 3-4 hours to pull down a hot, moist house when the unit is first installed or anytime it is turned off for a long period of time.

### HEAT PUMP--WINTER OPERATION

A heat pump is designed to heat and cool. The operation of your heat pump is entirely automatic. It is controlled by a thermostat which you set at the temperature most comfortable to you (68° - 70°). When the inside temperature drops below this setting, your thermostat senses this and turns on the system.

A heat pump acquires its heat from the outside air. At any time the outside temperature approaches 40°F, the outside coil temperature will be below 32°F or below freezing. Frost or ice will begin to form on this coil from the moisture contained in the air. After any continuous run time of 60 minutes, the unit will automatically go into a defrost cycle.

### DEFROSTING

As the unit goes into the defrost cycle, a hissing noise will be heard from the outside unit. The unit continues to run during defrost, except the outdoor motor stops, and as the frost is melted, steam will probably emit from the unit. Many times there is also water draining at the bottom of the coil as well. When the coil is defrosted, again a hissing noise will be heard and the unit will reverse back on heat cycle. There is no definite time limit for this cycle (1 - 7 min.). The lower the outside temperature and the higher the humidity, the longer the defrost cycle will last.

A heat pump, unlike an electric furnace, will not supply extremely hot air from the discharge ducts. Depending on the outside temperature, the air leaving the discharge grille will vary from as low as 75°F, to as high as 110°F. Any air temperature below 98.6°F will feel cool to the human body. This does not mean that your system is not working properly.

(NOTE: See section on "Supplemental Heat".)

### NIGHT SETBACK--HEATING CYCLE

A heat pump is not designed for a rapid change of indoor temperature, but is designed to maintain a constant temperature 24 hours a day. If a heat pump is turned down (to 55°) or off, at night, it will use supplemental heat to reheat the house to 68° - 70°F. This can consume as much power as would be required on automatic operation.

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If automatic night setback is desired, it is recommended that an electronic heat pump thermostat with preprogrammed recovery be used because this thermostat will gradually reheat the house to 68° - 70°F automatically with the minimum use of supplemental heat. See thermostat operating instructions for details.

## **SUPPLEMENTAL HEAT**

It is recommended that some supplemental heat be installed with every unit. Package units usually use electric heaters for supplemental heat. Split units may use a fossil fuel furnace (gas or oil) or an electric furnace for supplemental heat. Not only will the supplemental heat temper the indoor air during defrost cycles but it will also help to maintain the desired room temperature over a 24 hour period.

With a supplemental heater installed as a part of the system, they are controlled by the second stage of the wall thermostat and possibly also by an outdoor thermostat. The use of outdoor thermostats depends upon climate and number of electric heaters or fossil fuel costs used for a given installation.

The air discharge temperature may sometimes be higher than described under "Winter Operation,"...this occurring whenever second stage of wall thermostat or an outdoor thermostat calls for additional heating capability because of lower outdoor temperatures requiring more heat to be put into the building to maintain indoor set point temperature.

## **HEATING-COOLING SYSTEM OPERATION**

### **THERMOSTAT**

For most efficient operation, set the thermostat at the temperature you prefer--and let it take over. Set the SYSTEM switch to "COOL" or "HEAT". Set FAN switch to "AUTO". Everything else is automatic DON'T BE A "THERMOSTAT JIGGLER".

Although outside temperatures may vary 10 to 20° during a normal 24 hour period, the operation of your air conditioning unit is automatic. It is controlled by a thermostat which you set at a temperature most comfortable to you (75° to 80° for cooling and 68° to 70° for heating). When the inside temperature changes above or below these cooling or heating settings, your thermostat senses this and turns on the system.

As you no doubt know, setting the thermostat to a position lower than you actually want does NOT make it "cool faster", and the same holds true for heating. The greater the difference between outdoor and indoor temperatures, the greater the operating cost.

### **HEAT PUMP THERMOSTATS**

Most heat pump thermostats have indicating lights of some type located at the top of the thermostat.

#### **Two-Light Models--Green and Red Bulbs**

1. When the green light comes on and stays on, it is a signal that something is not working properly in the outdoor heat pump unit (1-Ph models only).
2. Move the system mode lever to "EM HT" and call your serviceman.
3. The red light will come on and stay on continuously, even if the indoor unit is not operating. You still have automatic temperature control indoors, with the supplemental electric heaters providing the necessary heat.
4. It may be necessary to raise the set point lever one or two degrees to maintain the same indoor temperature because the thermostat will now operate on second stage only.

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## **VENTILATION WITHOUT COOLING OR HEATING**

There may be periods when you want ventilation only, with no heating or cooling (available on most units). Ventilation is also controlled by the thermostat. Set SYSTEM switch to "OFF". Set FAN switch to "ON". This will give you "filter clean" air circulating in your home. Some people prefer constant air circulation.

## **EMERGENCY HEAT SWITCH (Heat Pumps Only)**

All heat pump thermostats discussed above are equipped with a manually operated switch designed into your system to control the supplemental heat portion of your heating system independently of the heat pump compressor. When to use the "EM HT" switch is described under the heat pump thermostat descriptions. Use of this switch interrupts the compressor control circuit and allows the supplemental heating system to supply heat in its place. The system is still under automatic thermostat temperature control. CALL YOUR LOCAL SERVICE MAN OR INSTALLER TO CHECK YOUR SYSTEM.

## **RUNNING TIME**

The most serious concern of the average new owner of a heat pump is: "Why does it run so much? Won't it use a lot of electricity?" The answer is "NO", and here's why:

The heat pump produces a low level of heat and uses a modest amount of electricity in the process. It does not get as hot as a gas or oil fired furnace and the air coming from your supply registers will not feel as warm as that from a gas or oil fired furnace. Once you recognize this and accept the lower discharge temperature, you will be much more comfortable. Comfort isn't necessarily the result of frequent blasts of hot air, but of a steady, smooth flow of lower temperature air for a longer period of time. That's how your heat pump system does it.

At low outdoor temperatures, the heat pump may be expected to run continuously. This is normal operation.

## **POWER OFF**

Do not shut off the power to your air conditioner or heat pump in the spring and fall when neither heating nor cooling is required. This also applies when you are on vacation or away from home for the weekend or for a few days. If you do not wish the unit to operate during your absence, turn the thermostat "system" switch to "OFF" but do not open the power switch.

Why? Refrigerant compressors (pumps) are designed to pump gaseous refrigerant only--no liquid. Refrigerant gas is, therefore, constantly flowing in and out of the compressor when the unit is in operation. When it isn't operating, the gas tends to migrate and condense inside the compressor where it definitely isn't wanted. To avoid this, there is an electric heater in, or attached to, the housing of the compressor. This little heater draws very little liquid refrigerant to revert to the gaseous form, it effectively prevents the accumulation of liquid in the compressor sump and permits the pump to operate only as it should. This "crankcase heater", as it is called in the industry, is fed from the same line service as the compressor motor. Thus, the main power to the outdoor unit should remain on at all times.

## **POWER OFF DURATION**

If the power is removed, for any reason at all, for more than two or three hours, the heat pump should not be restarted until power has been restored to the unit for at least four hours. This gives the crankcase heater time to drive any liquid out of the compressor. Be sure the thermostat is set at "OFF" before power is applied to the outdoor unit. Additional information can be found on a decal located on the outdoor unit.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the integrity of the financial system and for the ability to detect and prevent fraud.

2. The second part of the document outlines the various methods used to collect and analyze data. It describes the use of statistical techniques to identify trends and anomalies in the data, and the importance of using reliable sources of information.

3. The third part of the document discusses the role of the auditor in the process. It explains that the auditor's primary responsibility is to provide an independent and objective assessment of the financial statements, and to ensure that they are prepared in accordance with the applicable accounting standards.

4. The fourth part of the document describes the various types of audits that are conducted. It distinguishes between internal audits, which are performed by the organization's own staff, and external audits, which are performed by independent third parties.

5. The fifth part of the document discusses the importance of communication in the audit process. It emphasizes that the auditor must maintain open and effective communication with the management and the board of directors, and must provide clear and concise reports of the findings of the audit.

6. The sixth part of the document discusses the various challenges that auditors face in their work. It identifies the need for auditors to stay up-to-date on the latest developments in accounting and auditing, and to maintain a high level of professional skepticism and integrity.

## MAINTENANCE

**WARNING: DISCONNECT ALL POWER TO UNIT BEFORE STARTING MAINTENANCE.**

### CLEANING OR REPLACING FILTERS

Filter life will vary depending upon local conditions. If examination of the filters indicates an accumulation of dirt that restricts the passage of light through the filters, they should be cleaned or replaced. Some units have filters that can be cleaned (and re-oiled where required) and reused. Always replace filters with the same size and type filters supplied with your unit. **DIRTY FILTERS WILL AFFECT THE PROPER PERFORMANCE OF YOUR AIR CONDITIONER OR HEAT PUMP AND SHOULD NOT BE NEGLECTED.** Filters are usually located in the return air duct or at the indoor section of your unit. Check your installing dealer for location on your unit.

**NOTE:** Arrows on the filters must always point in the direction of the air flow through the filter.

**LUBRICATION CARE--**Direct drive motors are permanently lubricated and should require no oiling.

### WATER DRAINAGE--INDOOR UNIT

Excess moisture is removed from the air by the inside coil. This water is carried away by a permanent drain connection. Periodically check drain to make sure it is clear of obstructions and is carrying off the water.

### CARE OF CABINET

Washing off the coil with a garden hose is permissible as long as the unit is turned off. The surface of the cabinet is finished with a high quality baked-on enamel, especially designed for outdoor use. To further protect and preserve the cabinet, it is recommended that a high grade automobile polish be rubbed on every 6 months.

### INSUFFICIENT HEATING OR COOLING

In extremely hot or cold weather your unit will continually deliver its normal supply of conditioned air. If the unit operates but fails to provide sufficient comfort, check the following (before calling a serviceman).

- A. Be sure thermostat setting is correct.
- B. Air filters--replace or clean if dirty.
- C. Be sure air can circulate freely throughout the house--do not block supply registers or return grilles.
- D. Keep the surface of the outdoor coil free from dirt, lint, leaves and other foreign matter.

### FAILURE TO OPERATE

- A. Check thermostat for proper temperature and SYSTEM switch is turned to either "COOL" or "HEAT".
- B. Check to be sure that electrical power is ON. Check the thermostat setting.
- C. Check for blown fuses and replace. Be sure fuses are the time delay type and are proper size as shown on outdoor unit rating plate.

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- D. Check air circulation at the outdoor unit to be sure it is not obstructed.
- E. Check to see that filters are clean and that the air intake on the air conditioner is free from restriction.
- F. Make sure that all supply registers are open and that rugs or furniture are not obstructing cold air returns.
- G. Check the check light on thermostats. If it is green, turn the SYSTEM switch to "OFF". Then return the SYSTEM switch to the heating or cooling position.

NOTE: Wait at least 3 - 5 minutes before restarting the unit to give the pressure a chance to balance out. If the unit is restarted in less than 3 minutes, it may blow a fuse or cycle on its overload and stop complete operation for one hour or longer.

If the unit still does not start or starts but continues to cycle off, it indicates an operating defect. Turn the unit "OFF" and call your serviceman.

## SERVICE

At no time should you attempt mechanical adjustments or service on your air conditioner or heat pump unless, of course, you are a qualified heat pump serviceman and only then. The heat pump is much more than the average household appliance and "Do-It-Yourself" service is discouraged. EVIDENCE OF SELF-SERVICE OR TINKERING WITH AN IN-WARRANTY UNIT MAY VOID THE REMAINDER OF YOUR WARRANTY.



# EQUIPMENT INSTALLATION RECORD

OUTDOOR UNIT MODEL \_\_\_\_\_  
SERIAL NUMBER \_\_\_\_\_  
INDOOR UNIT MODEL \_\_\_\_\_  
SERIAL NUMBER \_\_\_\_\_  
INSTALLATION DATE \_\_\_\_\_  
START-UP DATE \_\_\_\_\_

**INSTALLED BY:**

COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_  
STATE \_\_\_\_\_ ZIP \_\_\_\_\_  
PHONE \_\_\_\_\_

**CONTACT INSTALLER ABOVE FOR ALL SERVICE**

If additional information is required concerning this equipment, contact:

Customer Service Department  
P. O. Box 607, Bryan, Ohio 43506  
Phone: (419) 636-1194

# THE HISTORY OF THE

The history of the world is a long and varied one, filled with many interesting events and people. It is a story that has been told in many different ways, from ancient times to the present day. The history of the world is a story of progress, of discovery, and of the human spirit. It is a story that has shaped the world we live in today.

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