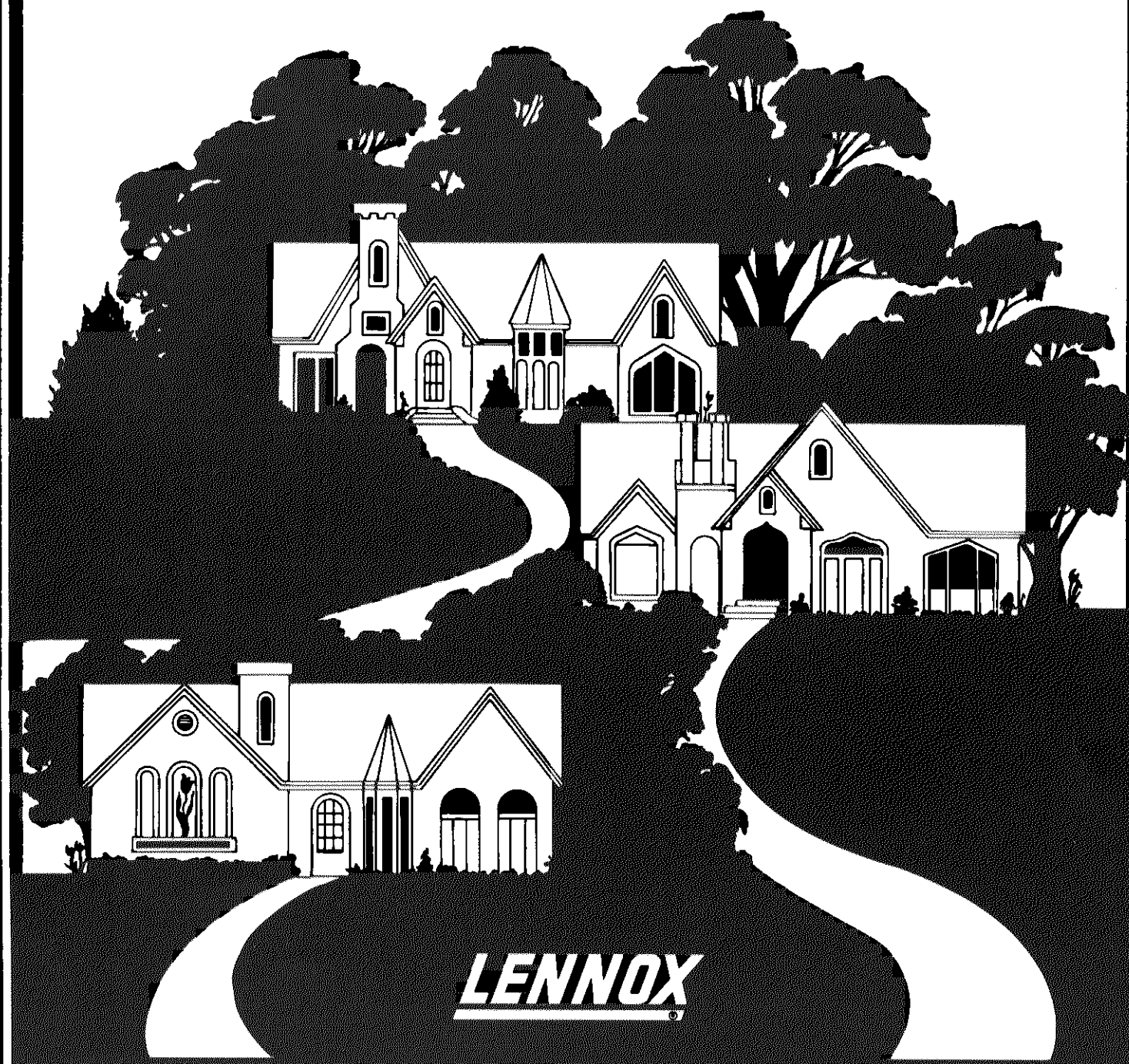


Your Guide To Total Economical Comfort

INFORMATION ON OPERATION
● MAINTENANCE ● SERVICE ●
OF YOUR COMFORT SYSTEM

Heat Pump Systems



Congratulations on your investment in a new Lennox heat pump system.

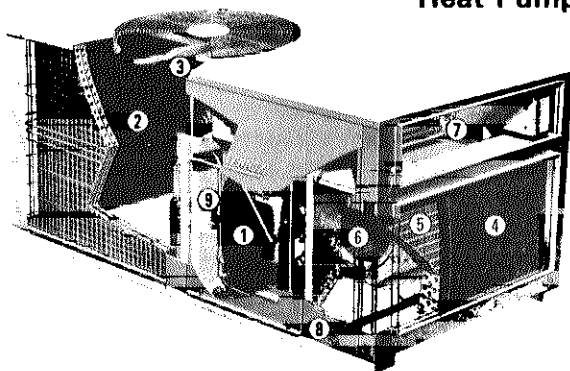
This booklet describes the different types of heat pump systems presently in use, and explains how they operate. By understanding your heat pump's operational characteristics, you will be able to use your equipment to its full potential, resulting in energy savings and total comfort.

HEAT PUMP SYSTEMS

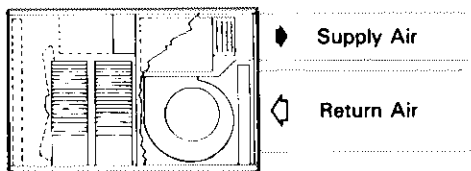
As illustrated in the following pages, your Lennox heat pump may either be a split system with separate indoor and outdoor components or a single package model having all the components outdoors. Electric heaters may be used to supply additional heat at low temperatures and during defrost. In addition to the standard split heat pump system, a special Fuelmaster +™ split heat pump system may be used which combines the operation of an outdoor heat pump with an existing furnace such as oil or gas.

STANDARD PACKAGED SYSTEM (Entire Unit Sets Outdoor)

Typical Packaged Heat Pump

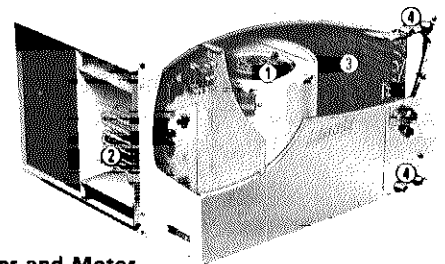


- | | |
|--------------------------|----------------------------|
| 1. Compressor | 5. Indoor Coil |
| 2. Outdoor Coil | 6. Indoor Blower and Motor |
| 3. Outdoor Fan and Motor | 7. Electric Elements |
| 4. Filter | 8. Condensate Drain |
| | 9. High Pressure Switch |



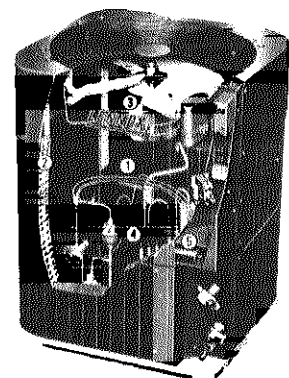
STANDARD SPLIT SYSTEM (Outdoor Heat Pump and Indoor Blower/Coil)

Typical Indoor Blower Coil

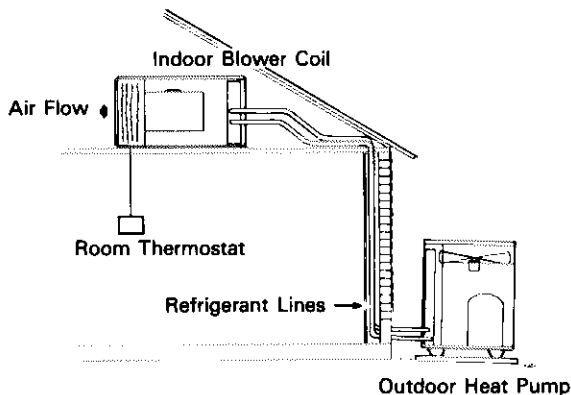


1. Indoor Blower and Motor
2. Electric Heater (Opt.)
3. Indoor Coil
4. Condensate drains

Typical Outdoor Heat Pump



1. Compressor
2. Outdoor Coil
3. Outdoor Fan and Motor
4. Reversing Valve
5. High Pressure Switch

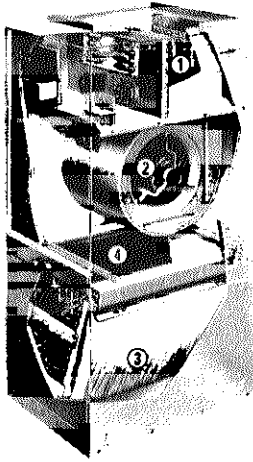


Indoor Blower Coil Unit
(Shown in horizontal position—
May also be up-flo or down-flo)

HEAT PUMP SYSTEMS

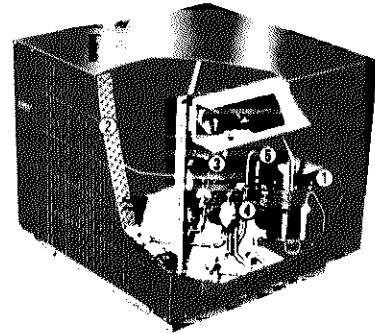
STANDARD SPLIT SYSTEM (Outdoor Heat Pump with Indoor Electric Furnace and Coil)

Typical Electric Furnace w/Coil

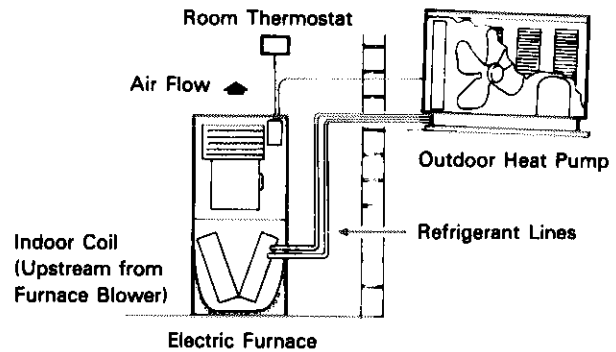


1. Electric Elements
2. Indoor Blower and Motor
3. Filter
4. Indoor Coil

Typical Outdoor Heat Pump

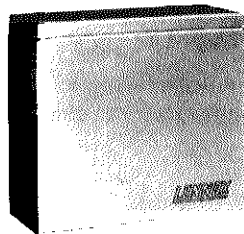
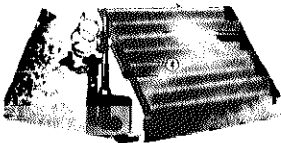


1. Compressor
2. Outdoor Coil
3. Outdoor Fan and Motor
4. Reversing Valve
5. High Pressure Switch



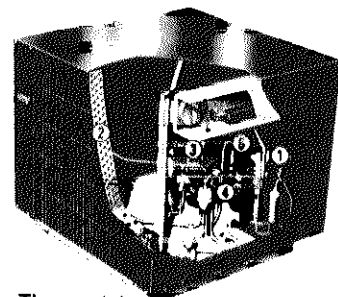
FUELMASTER +^{T.M.} SYSTEM (Outdoor Heat Pump with Indoor Furnace, Coil and Fuelmaster Control)

Typical Indoor Coil

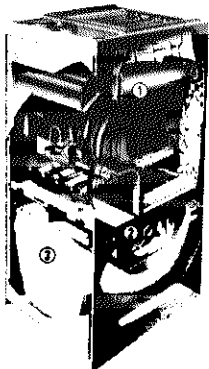


FUELMASTER
CONTROL

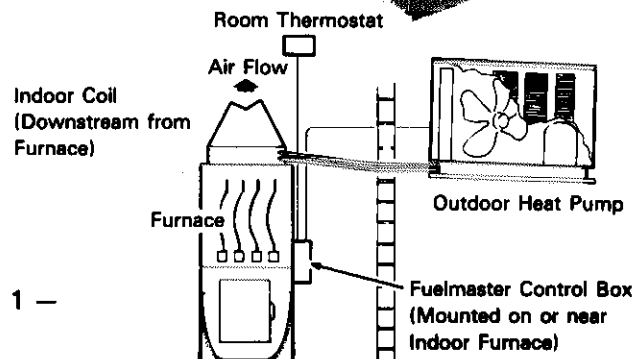
Typical Outdoor Heat Pump



1. Compressor
2. Outdoor Coil
3. Outdoor Fan and Motor
4. Reversing Valve
5. High Pressure Switch



1. Heat Exchanger
2. Indoor Blower and Motor
3. Filter
4. Indoor Coil



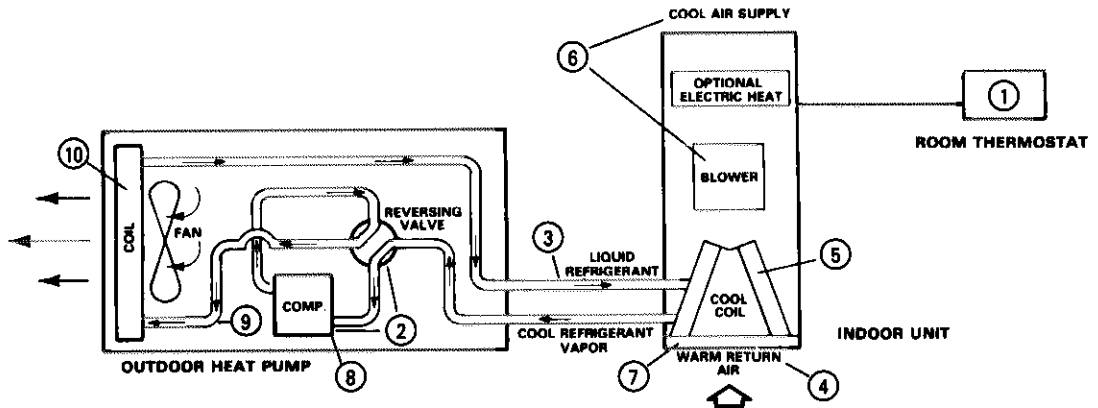
Typical Indoor Gas Furnace

HOW A HEAT PUMP WORKS

COOLING CYCLE

A - COOLING REFRIGERANT CYCLE

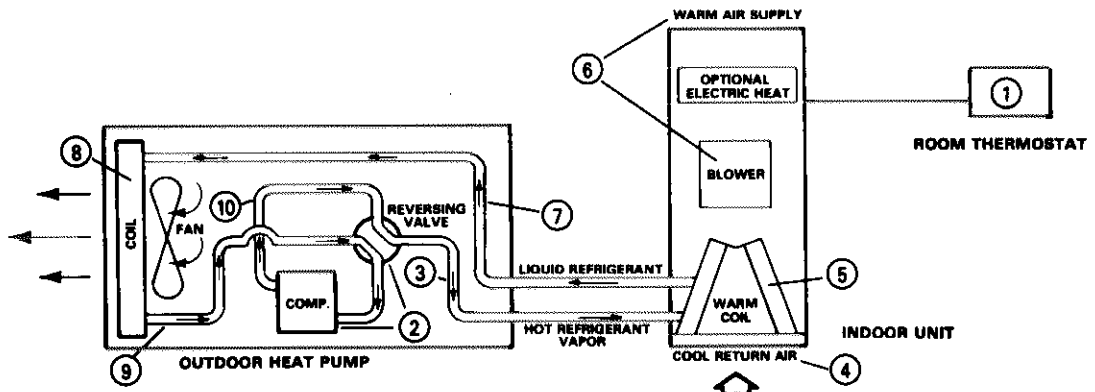
1. The thermostat calls for cooling.
2. The reversing valve and compressor are energized.
3. The liquid refrigerant is sent on to the indoor coil.
4. Warm air is drawn over the indoor coil by the blower.
5. The refrigerant absorbs heat from the indoor air and changes into a cool vapor.
6. This lowers the temperature of the supply air which is distributed throughout the controlled space.
7. This temperature change will remove moisture from the air and form condensate which must be piped to a suitable drain.
8. The compressor suction pressure draws the refrigerant back into the compressor where its temperature and pressure are greatly increased.
9. The compressor pumps hot refrigerant gas to the outdoor coil.
10. The fan dissipates heat from the refrigerant and changes it into a liquid. This completes one cooling refrigerant cycle.



HEATING CYCLE

B - HEATING REFRIGERANT CYCLE

1. The thermostat calls for heating.
2. The compressor is energized while the reversing valve remains de-energized.
3. The compressor pumps hot refrigerant gas to the indoor coil.
4. Cool return air is drawn over the indoor coil by the blower.
5. The refrigerant releases its heat into the return air stream and consequently turns into a liquid.
6. The warmed supply air is distributed throughout the controlled space.
7. The liquid refrigerant is transported to the outdoor coil.
8. The refrigerant absorbs heat from the outdoor air that is blown across the coil by the fan.
9. The refrigerant turns into a cool vapor which is drawn back to the compressor.
10. The compressor increases the temperature and pressure of the refrigerant. The hot refrigerant is then pumped back to the indoor coil to start another cycle.



HEAT PUMP OPERATION

COOLING CYCLE OPERATION

While in the cooling mode Lennox heat pumps operate in the same manner as standard air conditioners. A demand for cooling from your room thermostat begins the cooling cycle.

CYCLE TIME

The operating time of the equipment depends on the cooling load on the conditioned area. As outdoor temperature increases, more operational time is required to cool the conditioned area. At higher outdoor temperatures it is normal for the equipment to operate continuously.

STARTUP TIME DELAYS

Some heat pumps are equipped with a timed interlock control that will prevent the compressor from operating for up to five minutes between cycles. The units will start automatically on thermostat demand when this internal timing cycle is completed. This delay may be noticed when setting the thermostat for a cooler temperature, and the unit does not start immediately.

TWO SPEED UNITS

Lennox heat pumps that are equipped with energy saving two speed compressors are designed to operate for long periods of time at low speed. As the outside air temperature increases the compressor will switch to high speed. You may notice a 90 second delay between speed changes due to a protective timed interlock control built into your system.

LATENT LOAD DISCRIMINATOR

Two speed compressor units may be equipped with a blower control kit that operates the indoor blower at low speed during first stage, and at a higher speed for second stage compressor operation. This feature is controlled with a wall mounted dehumidistat and is used in climates where additional humidity control is required. The recommended setting is 50%, when the humidity is above 50%. The blower operates on low speed automatically with first stage thermostat demand. If the "FAN" switch on the thermostat is set for continuous blower operation, the blower operates at the higher speed, and the humidity control does not function.

HEATING CYCLE OPERATION

While the cooling cycle of all heat pumps systems are essentially the same, the heating cycle operation varies somewhat between the standard packaged or split system and the special Fuelmaster system. The Fuelmaster system is an optional accessory applied with supplemental gas or oil heat.

START UP TIME DELAYS

You will notice the same timed interlock delays discussed in the cooling cycle operation section while your heat pump is in the heating cycle.

TWO SPEED UNITS

As the outside temperature drops two speed compressor units eventually switch to high speed. High speed operation at lower temperatures provides the most efficiency. Equipment with latent load discriminators operate the indoor blower at high speed during the heating cycle, regardless of the compressor speed.

STANDARD PACKAGED OR SPLIT SYSTEMS

The heating cycle is controlled from first and second stage switches on the room thermostat. The first stage controls heat pump operation and the second stage controls the supplemental heat.

As the outdoor temperature drops, a greater amount of heat is required to maintain indoor comfort. Since the heat pump takes its heat from the outdoor air the heating capacity is reduced as the outdoor temperature drops.

With a drop in outdoor temperature, the heat pump (compressor) will operate longer periods of time between off cycles. As the temperature continues to drop, the compressor will eventually run continuously.

This is commonly known as the balance point where the heat requirement and the heat pump capacity are exactly balanced. The balance point will vary somewhat from installation to installation and depends on the actual heat loss from the conditioned space versus the capacity of the heat pump unit selected. On a large percentage of installations, the balance point falls in the range of 15 to 40°F (-9 to 4°C) outdoor temperature, however, do not be alarmed if your installation is slightly out of range.

As the temperature drops below the balance point, the compressor continues to run and the second stage switch on the thermostat automatically operates the supplementary electric heaters as needed to maintain indoor temperature control.

Continued on next page.

HEAT PUMP OPERATION

STANDARD PACKAGED OR SPLIT SYSTEMS (CONT.)

NOTE: There is an approximate 2 degree spread between first and second stage heat on the thermostat. (This is a built-in mechanical differential and is not adjustable.) At temperatures below the balance point there will be a room temperature control point shift of approximately 2 to 3 degrees. In other words the thermostat will maintain the house at a temperature 2 to 3 degrees below the setting on the thermostat. This is normal operation and does not indicate a malfunction in the thermostat. On cold days you can raise the setting of the thermostat to offset this condition.

FUELMASTER SYSTEM

The basic heating cycle operation of the heat pump previously explained applies to the Fuelmaster System except:

1. On Fuelmaster Systems the indoor furnace is applied upstream (ahead) of the refrigerant coil.
2. To obtain efficient operation and prevent damage to equipment components a different sequence of operation and control package is required. A two-stage heat thermostat is used; the first stage controlling heat pump operation and the second stage controlling the furnace operation.

The heat pump will handle all the heating needs until the outdoor temperature reaches the "balance point" of the structure (heat loss equals heat pump capacity). When the temperature goes below the balance point, the second stage of the thermostat starts the furnace. At this point, a heat relay shuts off the heat pump unit.

When the second stage furnace has satisfied the space temperature needs and the plenum temperature has cooled to 90-100°F (32 to 37°C) a heat pump delay turns the heat pump back on. The heat pump controls the conditioned space until second stage operation is required again.

COMPRESSOR LOW TEMPERATURE CONTROL (CHP9 and CHP10 Packaged Heat Pumps Only)

Outdoor packaged heat pumps are equipped with a low temperature switch that shuts the compressor off at a preset outdoor temperature. This control is adjusted by the installing contractor and is normally set to shut the compressor off between 15°F and 0°F (-9°C and -17°C). The on temperature is approximately 5 degrees above cutoff. This control helps protect your system at low temperatures.

Lennox split system heat pumps have built in protective features that allow continuous operation at low temperatures. These units are not equipped with a compressor low temperature control.

DEFROST CYCLE

Heat pumps in the heating cycle at outdoor temperatures below 45°F (7°C) operate with outdoor coil temperature below freezing and frost forms on the coil. This reduces system efficiency, so the frost must be removed. An automatic defrost cycle energizes the reversing valve and reverses the refrigerant cycle long enough to clear the outdoor coil of frost. The unit then returns to the normal heating cycle. Current Lennox heat pumps have a timed defrost cycle that initiates defrost at temperatures below 40°F (4.4°C) every 90 minutes. This timing cycle may be adjusted by your installer to suit local weather conditions. Older model defrost controls do not use timers, but sense pressure and temperature differentials to initiate defrost.

At temperatures below 30°F (-1°C) less moisture is in the air and frost accumulation is slower. The defrost cycle lasts a maximum of 10 minutes. If defrost cycles last over 15 minutes, call your dealer.

During the defrost cycle in low temperature weather, it is not uncommon to see moisture vapor (steam) rising from the outdoor unit. Do not become alarmed as this is a normal defrost condition.

REVERSING THE REFRIGERANT CYCLE

At the beginning and ending of a defrost cycle and when changing from heating to cooling or cooling to heating cycle, the reversing valve in the outdoor section will actuate, changing the direction of the refrigerant flow in some parts of the system. A swishing or gurgling sound generally accompanies this action and is normal operation.

HEAT PUMP HEATING CHARACTERISTICS

Homes heated with heat pumps will have somewhat different environmental characteristics than those heated with conventional gas, oil, or electric furnaces in that the amount of air in circulation will be considerably greater and the discharge temperatures from the registers and grilles will be cooler. Your heat pump system is designed to efficiently maintain the room temperature set on the thermostat by moving a large amount of lower temperature air. A furnace, on the other hand, moves a lesser amount of higher temperature air. For this reason, it will take the heat pump longer to raise the room temperature if the heating setting on the thermostat is raised.

USING YOUR HEAT PUMP

POWER SUPPLY

1. Single Package System—Normally the disconnect switch is mounted on or near the outdoor unit.
2. Split Systems - Each unit (indoor or outdoor) will normally have a disconnect switch mounted on or near each unit.

The disconnect switches for the equipment may be fused in the switch boxes or the fusing (or circuit breakers) may be located in the main power box of the structure.

CRANKCASE HEATERS

NOTE: It is important to keep power to the outdoor equipment on at all times. The compressor is equipped with a crankcase heater (also known as "oil rectifier"). Crankcase heaters are useful in cool weather conditions, as refrigerant in a condensed liquid state can migrate to the compressor crankcase and mix with the compressor lubricating oil. Should the compressor be started under these conditions, it would be forced to pump refrigerant and oil; this would damage or ruin the compressor, as compressors are designed to compress refrigerant only as a gas. It would also cause lubrication problems as the compressor oil would be pumped out of the crankcase with the liquid refrigerant.

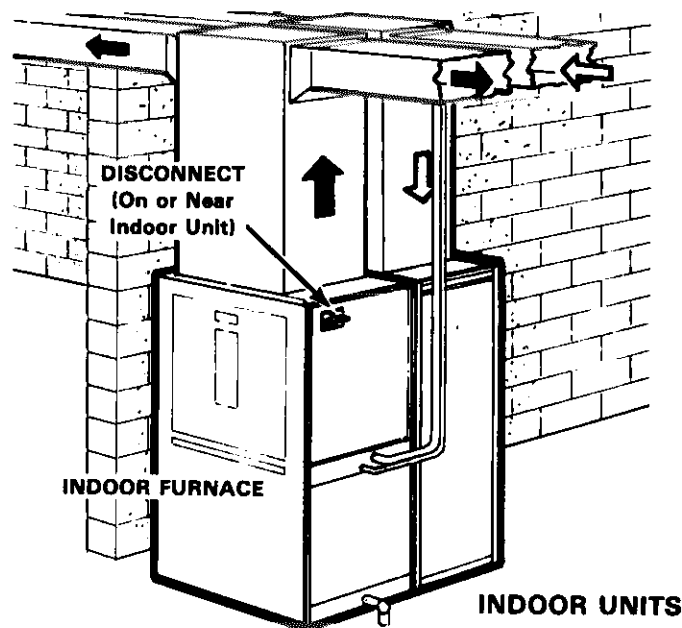
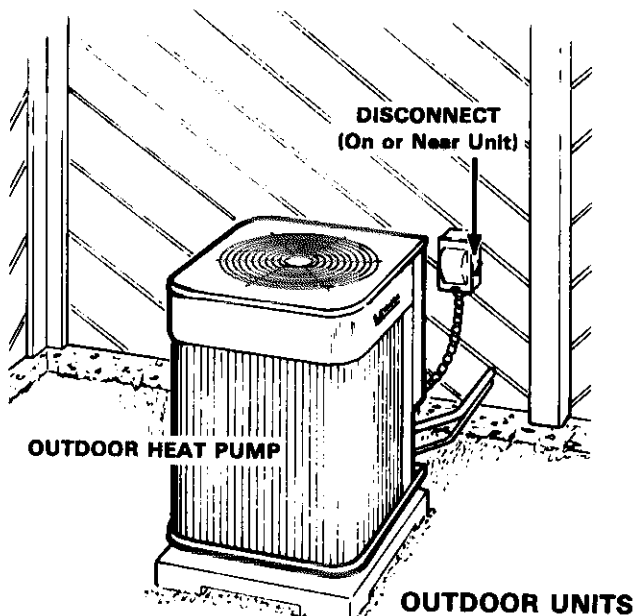
This is where the crankcase heater comes into play as a protective device for the compressor. At cooler temperatures the heater is on, raising the temperature of the crankcase enough to prevent refrigerant from condensing to a liquid in the compressor.

Do not turn off the unit disconnect switches except for servicing or emergency. Use the "Control Switch" on the room thermostat for normal switching as this allows the compressor crankcase heater to remain on. If the power has been off for more than one hour and the outdoor temperature is below 50°F (10°C), the compressor should not be restored for at least 6 hours after the power has been restored. Failure to observe these instructions can result in compressor damage or failure.

TEMPORARY HEAT

To obtain temporary heat after power outage (without the risk of serious equipment damage) set the system selector on the room thermostat to the "Emergency Heat" setting on thermostats equipped with emergency heat switch. This prevents compressor from starting and allows thermostat to control the supplementary electric elements and provide space heat. At the end of the 6 hour period, the thermostat control switch can be reset to the "Heat" position.

DISCONNECT LOCATIONS



START UP

Your Lennox heat pump is fully automatic, working from room thermostat demand. To begin operation:

Check that the power supply is on at the unit disconnect switch for a minimum of 6 hours. See note above under POWER SUPPLY. Set the room thermostat CONTROL SWITCH to the desired mode and move the temperature selector to the desired level.

To shut off heat pump system —

1. Set the room thermostat CONTROL SWITCH to the "OFF" position.
2. For complete system shutdown, turn the power supply "OFF" at the unit disconnect switch.

ROOM THERMOSTAT OPERATION

A thermostat is an adjustable temperature actuated switch. It automatically cycles your comfort system on and off to maintain a constant temperature. Basic heat pump thermostats have 1 stage cool, 1 stage heat and 1 stage auxiliary heat. Lennox 2 speed compressor heat pumps use a specially designed thermostat with 2 stage cool, 2 stage heat and 1 stage auxiliary heat.

CONTINUOUS VS. INTERMITTENT BLOWER OPERATION

It is generally more satisfactory to operate the indoor blower continuously as it provides constant air change and filtering, provides a more even temperature from floor to ceiling and from room to room.

On multilevel homes it is highly desirable to operate the blower continuously in order to provide more even temperatures on the various levels. The extra power needed to operate the blower is not lost as the heat passes into the air and into the conditioned space. Intermittent blower operation operates satisfactorily on some installations and is preferred by some owners. We suggest that you try it both ways and select the mode of operation that suits your needs best and provides the most comfort.

TEMPERATURE ADJUSTMENT

Do not move the thermostat temperature setting excessively, as this may blow a fuse or trip a circuit breaker. Allow at least five minutes after the unit shuts off before readjusting the thermostat to restart the heat pump. This allows time for pressures in the system to equalize for proper compressor startup. Some systems have built-in timed interlock controls to prevent premature startup and a time delay is normal after thermostat adjustment.

Best operation is obtained by setting the thermostat and allowing it to cycle the equipment, rather than readjusting the setting manually to turn the heat pump on and off. If temperature is not even and comfortable in all rooms, refer to "BALANCING YOUR SYSTEM" on page 12.

RESTARTING EQUIPMENT

If your heat pump fails to restart after it has been off for a short length of time, (less than one hour) turn the CONTROL switch on the room thermostat to the "OFF" position for 5 minutes to allow the system to equalize, then restart. See the POWER SUPPLY section for more information regarding restarting equipment.

EMERGENCY HEAT (Optional)

For use on systems that use supplementary heat (such as electric). On thermostats equipped with emergency heat switch, should the heat pump system malfunction the red light on the thermostat subbase will come on indicating the heat pump is not operating normally.

When you see this red light, move the control switch to the emergency heat setting. An amber light will come on to remind you that you are on straight electric heat alone. Call your serviceman as soon as possible to restore operation of the heat pump and regain maximum heating efficiency.

IMPORTANT: During adverse weather conditions such as snowstorms, icing, floods, etc., where the outdoor unit may be plugged or filled with water, switch to emergency heat setting until the condition is corrected.

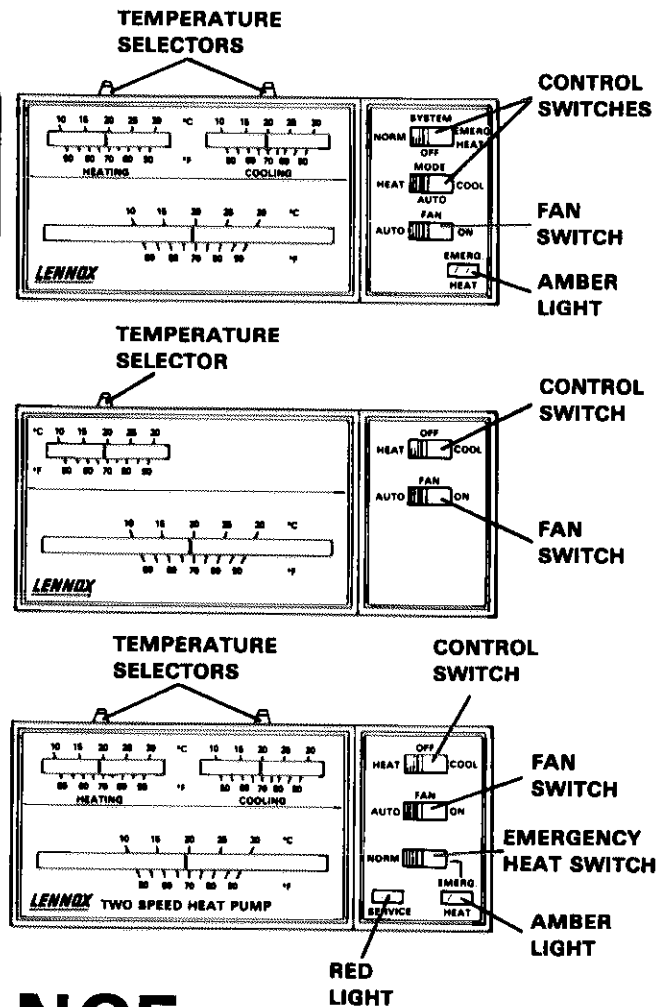
PROGRAMMABLE THERMOSTATS

With the use of higher efficiency equipment, and increased interest in savings on energy bills, many systems are installed with programmable thermostats. These provide the same "CONTROL" and "FAN" controls as standard thermostats, but also provide automatic heating setback and cooling setup. Please refer to the separate instructions provided with your programmable thermostat for operation and adjustments. Lennox now provides a programmable thermostat for use with single or two speed heat pumps.

ROOM THERMOSTAT OPERATION

CONTROL SWITCHES	AUTO	The heat pump will automatically heat or cool to maintain the desired temperature.
	OFF	The heat pump and auxiliary heat is turned off.
	COOL	The heat pump will keep the house cooled to the temperature that is selected with the temperature selector.
	HEAT	The heat pump and furnace will keep the house heated to the selected temperature.
	*EMERGENCY HEAT	The heat pump is locked off. The amber "emergency heat" light will shine continuously. The furnace will supply all the heat required.
FAN SWITCH	ON	The fan in the furnace will run all the time to provide air circulation.
	AUTO	The fan will cycle (turn on and off) as the heat pump cycles.
TEMPERATURE SELECTOR LEVER		Set to the desired temperature. Some thermostats have two temperature selector levers; one for heating and one for cooling.
*AMBER INDICATOR LIGHT	EMERGENCY HEAT	The light will be on only when control switch is placed in the emergency heat position. It is a reminder that your heat pump system is not operating at peak efficiency. (Optional).
*RED INDICATOR LIGHT	SERVICE	When this light turns on and off, it is telling you that your heat pump isn't operating at optimum performance levels. This could happen when you first put the control switch in the HEAT position or when you move the temperature selector up more than 2 degrees. At these times, let your heat pump operate without adjustment for one hour, and it should correct itself. If the light continues to blink after one hour of normal operation, first check the items listed in the "Before Calling for Service" section on page 11 of this manual. If problem persists switch to Emergency Heat. Then call your Lennox service dealer.

*Optional functions, not available on all thermostats.



MAINTENANCE

Your heat pump system should be inspected at least yearly by a trained Lennox serviceman. Your dealer can provide a Planned Service agreement that will keep your equipment operating at peak efficiency year after year.

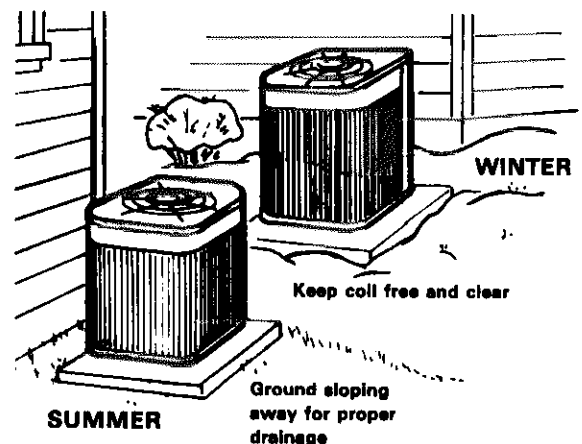
CAUTION: Before attempting to perform any service or maintenance operations, turn the electrical power off to both the indoor and outdoor units.

OUTDOOR EQUIPMENT

1. Check that grass, leaves, dirt, etc. do not obstruct the outdoor coil. The coil fins may be cleaned by flushing with a water hose. **BE SURE TO SHUT OFF POWER TO UNIT BEFORE FLUSHING TO AVOID ELECTRICAL SHOCK HAZARD.** Do not flatten or bend coil fins as this will harm unit efficiency. In winter operation, keep the inlet and outlet to the coil free of snow buildup. It will be normal for ice to accumulate around the outdoor coil area, prior to defrost cycles.
2. The fan motor in the outdoor unit may be oiled with a few drops of SAE No. 10 non-detergent oil every 1-2 years. This should result in longer bearing life. If the motor has no provisions for oiling, the bearings are permanently lubricated and sealed.

You may choose to have your Lennox serviceman perform this function as required, as some unit disassembly is required to reach fan motor oiling ports.

3. The outdoor unit should be setting with proper slope and graded so there is no buildup of water around unit. If there is a water drainage problem, call your Lennox dealer. Do not attempt to move the unit yourself as this may damage the unit's piping connections, resulting in refrigerant leaks and an inoperative system.
4. Your outdoor unit cabinet has been designed for minimum care. An occasional coat of wax will help to prevent deterioration of the finish and enhance its durability.



MAINTENANCE

INDOOR EQUIPMENT

INDOOR COIL — COOLING SEASON

Condensation takes place on the indoor coil and is piped to a suitable drain. Check the condensate drain for free and running condition. If water does not run freely, the drain pipe must be cleaned. Some coils are equipped with an auxiliary drain (second drain). This drain is usually piped to an outside location where it can be observed. The auxiliary drain is a safety device to prevent overflow of condensate into the house. If water runs from the auxiliary drain, it indicates that the main condensate drain is clogged. Immediate steps should then be taken to service the main drain. Your Lennox serviceman is properly trained to remedy this problem, and should be consulted in the event of this poor drainage condition.

FILTERS

Air filters should be checked monthly. A dirty filter should be replaced or cleaned immediately as it will cause your equipment to work a great deal harder than necessary, resulting in much energy waste and possible internal damage.

CAUTION: SHUT POWER OFF TO UNIT BEFORE REMOVING ACCESS PANEL TO CHANGE FILTER. WAIT FOR BLOWER TO STOP.

Fiberglass throw-away filters - Replace when required with new filters of the same size. Place filter into unit so that air flows in the direction of arrows on cardboard frame.

Plastic foam filters - Vacuum clean, or wash with mild dishwasher detergent. Rinse thoroughly with clean water and allow to completely dry. For increased filtering efficiency, the filter media should be re-sprayed with Filter Handicoater when dry. Filter Handicoater is available from your Lennox dealer as part number: P-8-5069. Replace filter in unit so that air enters the side opposite wire mesh, or in the direction of arrow, if filter has a plastic frame.

Hammock type filters - Replace media with the same size, 1" thick fiberglass material. Replacement media material is available from your Lennox dealer. Air should enter the colored side of media.

BLOWER ASSEMBLY

Blower motors used in Lennox equipment may be oiled with a few drops of SAE No. 10 non-detergent oil every 1-2 years. This will result in longer bearing life. Other considerations to follow apply to belt drive blower assemblies. See below.

CAUTION: SHUT POWER OFF TO UNIT BEFORE REMOVING BLOWER ACCESS PANEL. WAIT FOR BLOWER TO STOP.

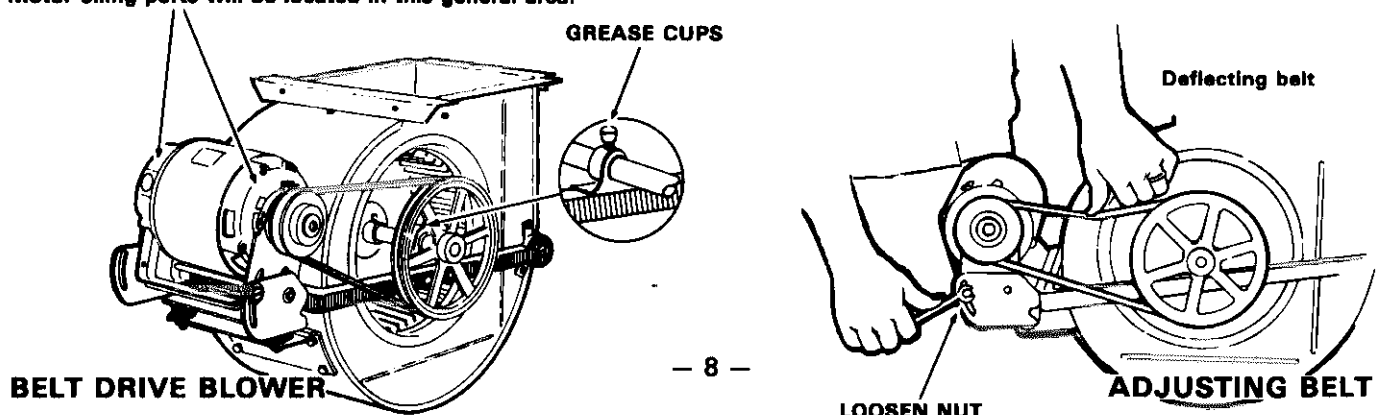
Direct drive blowers - It may be necessary to remove the complete blower assembly for access to oiling ports. This procedure is not recommended for most equipment owners as special tools and some mechanical ability are necessary. It may be better to have your local Lennox serviceman perform this function as required.

Belt drive blowers - See illustration for location of oiling ports on motor.

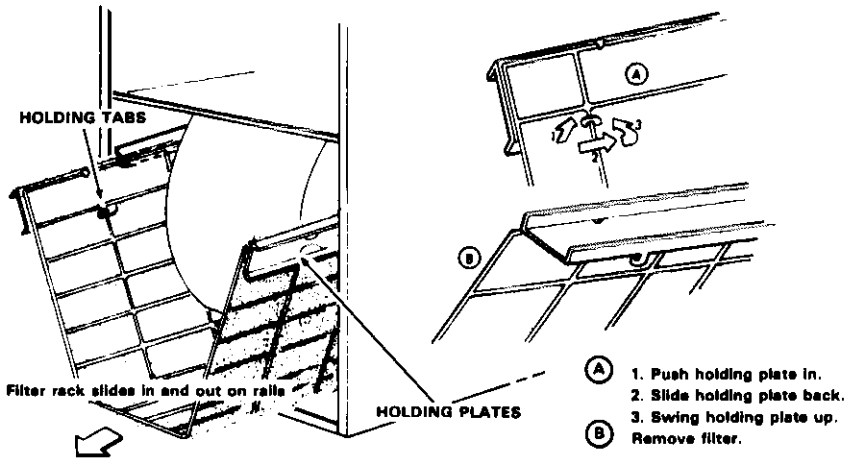
Belt drive blower assemblies have bearings located on each side of the shaft holding the blower wheel and drive belt pulley. If these bearings are of the type that require lubrication, they will be equipped with grease cups. Simply turn these cups down one full turn annually to lubricate bearings. When these cups are turned to bottom, they must be refilled, using ONLY "Lennox bearing lubricant" available from your dealer.

It is also a good idea to inspect the drive belt annually. The belt should be replaced if it shows any splits or cracks. The tension, or free play of the drive belt should be checked by pushing down on it midway between the two pulleys. The belt should move or deflect 1/2". To adjust the tension of belt, loosen nut on blower motor mount, slide motor up or back. Re-tighten nut. See illustration.

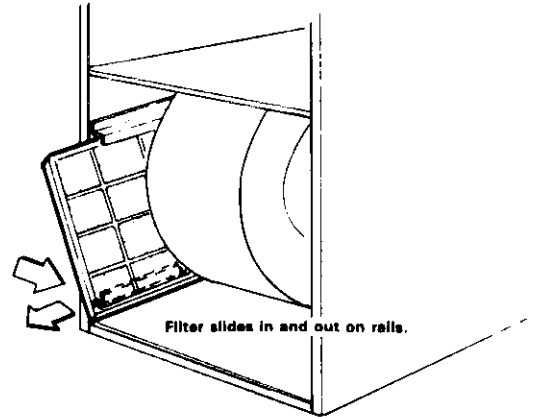
Motor oiling ports will be located in this general area.



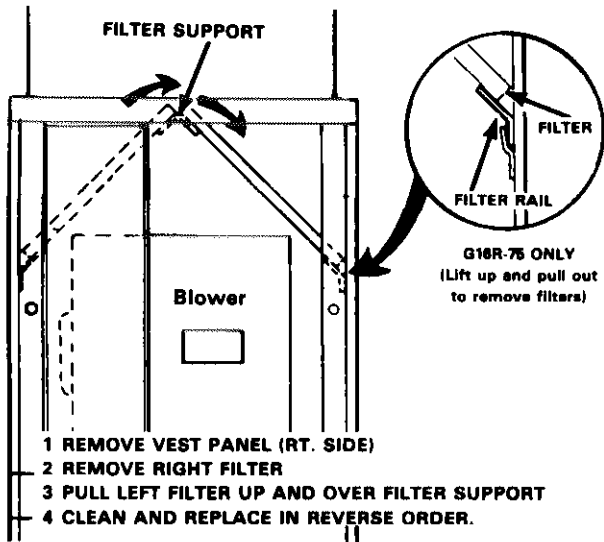
MAINTENANCE (FILTER LOCATION)



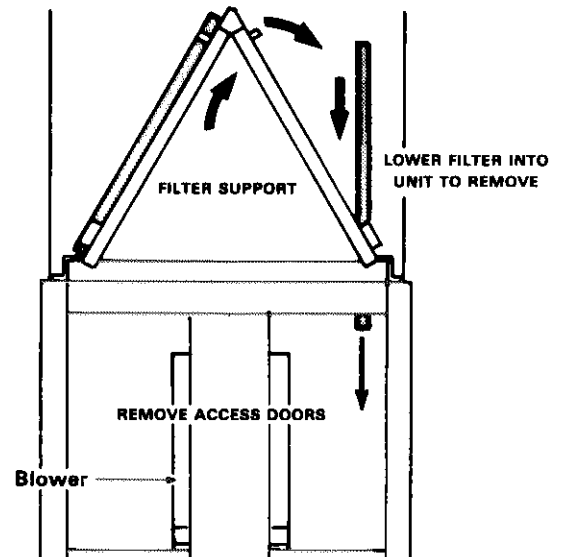
UP-FLO HAMMOCK FILTER



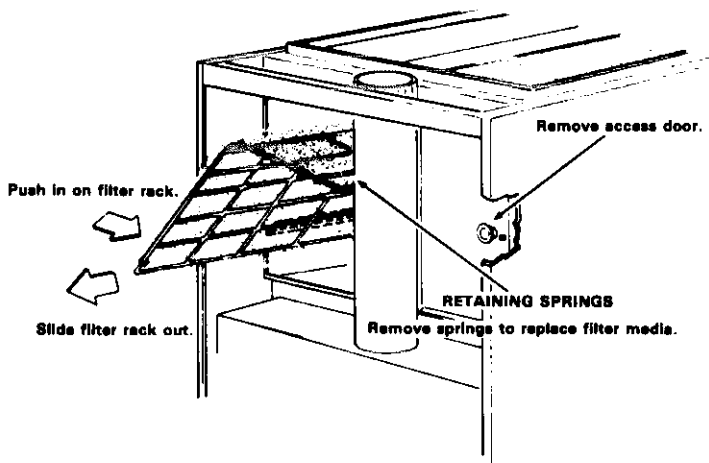
UP-FLO SLAB FILTER



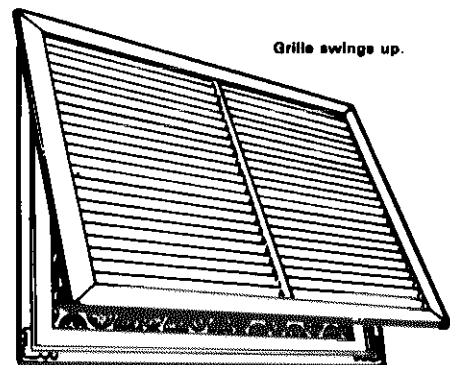
DOWN-FLO SLAB FILTER (IN CABINET)



DOWN-FLO SLAB FILTER (IN PLENUM)



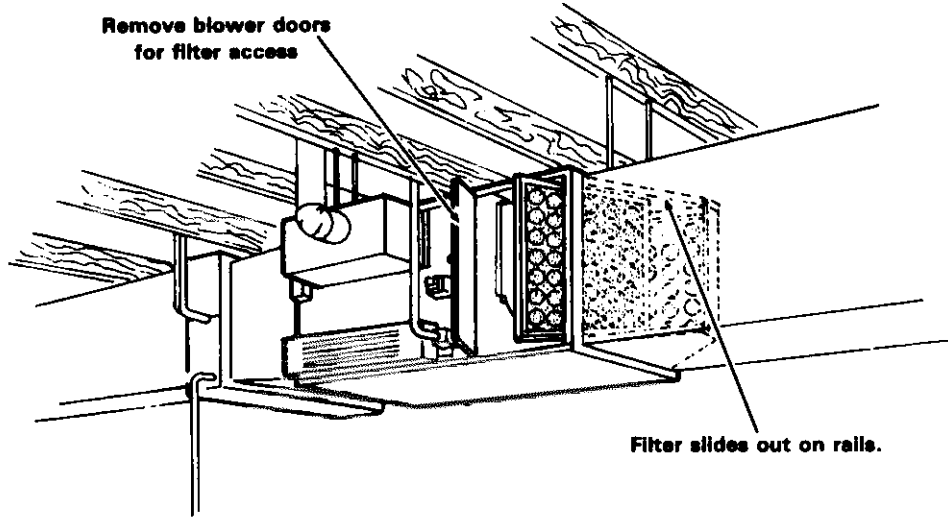
DOWN-FLO HAMMOCK FILTER



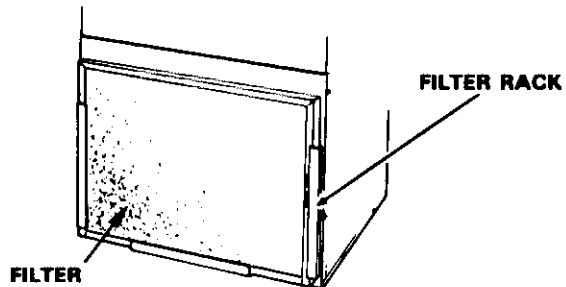
IN GRILLE FILTER

Note: Always use papers to protect your floor when changing filters. Dispose of used filters promptly, do not stack used filters in furnace closet, attic, etc. Area around furnace must be kept clean and free of combustible debris.

MAINTENANCE (FILTER LOCATION)

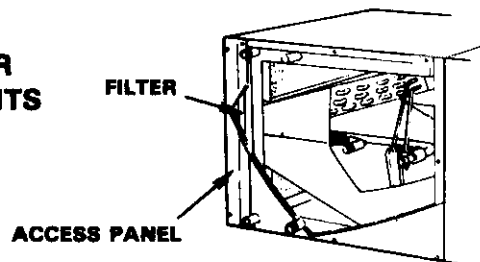


HORIZONTAL SLAB FILTER

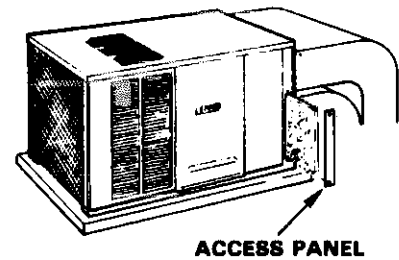


Filter slides in and out
from rack on the outside
of unit.

TYPICAL INDOOR BLOWER/COIL UNITS



Remove access panel -
filter slides in and out



To remove filters, first
remove access panel.
Filters slide in and out
on rails.

OUTDOOR PACKAGED UNITS

BEFORE CALLING FOR SERVICE

If your heat pump system does not appear to be performing properly, or does not operate at all, it may save you the cost of an unscheduled service call if you check a few conditions yourself, before calling your dealer for service.

INSUFFICIENT AIR FLOW

If you sense a gradual change in air flow, a dirty air filter is the most likely cause. Inspect the air filter, following the procedures in the Maintenance Section, pages 8 through 10.

Another cause of insufficient air flow is a blocked return-air or supply-air grille. Be sure all of these grilles are not covered by furniture or other items.

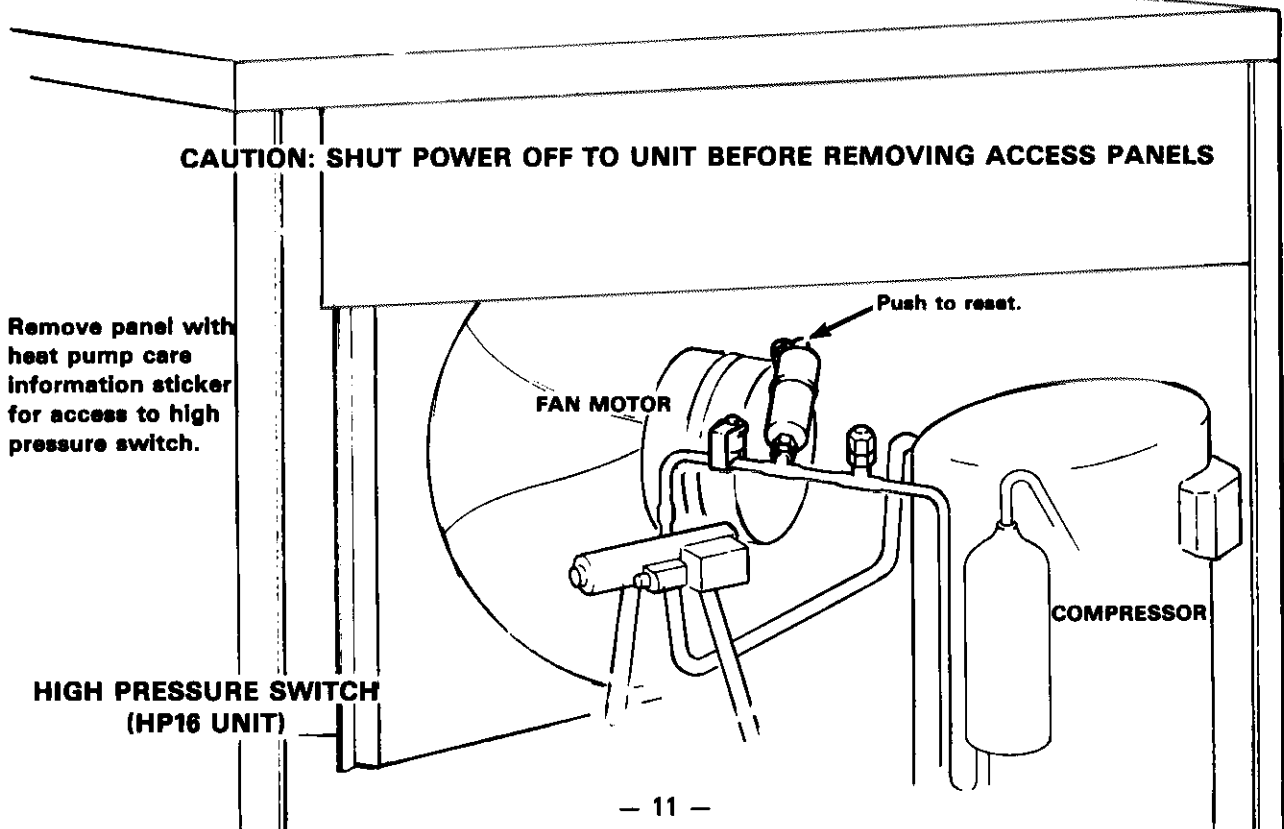
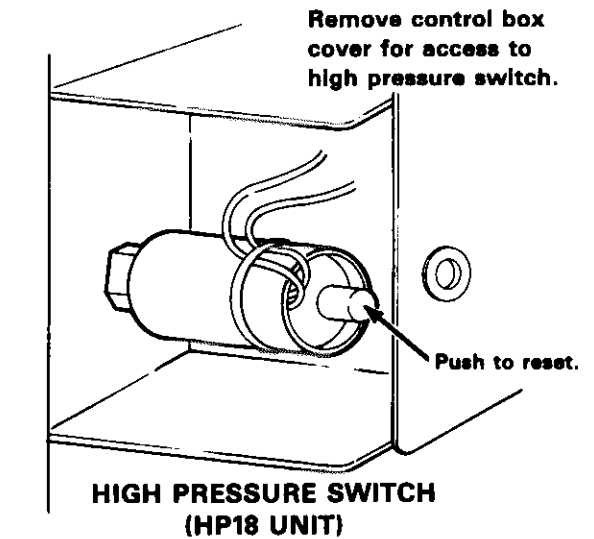
UNIT FAILS TO OPERATE

If your heat pump system fails to operate, follow these step-by-step instructions and proceed only to the next step if the unit fails to start.

1. Check that the electrical disconnect switches are on. See page 5.
2. Check that the room thermostat is properly set. See page 6.
3. Check for a blown fuse or tripped circuit breaker in the structure's main power box.
4. Turn "off" power, then check the manual reset pressure switch in the outdoor unit. See illustrations. Frequent resetting of the pressure switch is an indication of system problems. Call your Lennox serviceman should this condition develop.

UNIT SHORT CYCLING OR PRODUCING LITTLE OR NO COOLING OR HEAT

1. Check that the outdoor coil is free of obstructions restricting air flow through it.
2. Check that the indoor air filter is not dirty or plugged.
3. If the unit is short cycling every few minutes but producing little or no heating or cooling, turn it off, and call your Lennox serviceman.
4. If frequent defrost cycles are observed (less than 30 minutes between) call your Lennox serviceman.



BALANCING YOUR SYSTEM

Your Lennox installer has made the basic adjustments to the air distribution system in your home. But you and your family are the only ones who know exactly to what degree you want the various rooms conditioned. For that reason, you are the most logical person to "balance" the system.

Balancing is a simple procedure of controlling the amount of conditioned air delivered to the various rooms in your house.

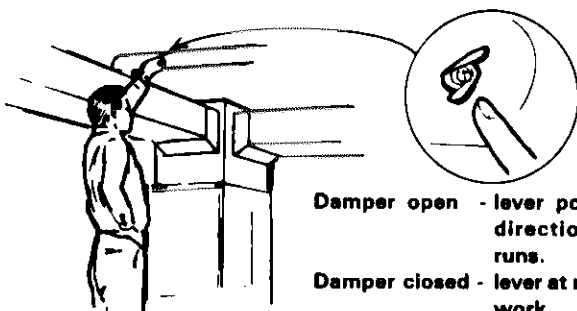
There are five easy steps in balancing the system.

1. Pick a day when the temperature of the outside air is typical for the time of year. Leave the thermostat on one setting for several hours before proceeding to step 2. All dampers, ducts, and registers should be open.
2. Check the temperatures in all rooms. You can do this by using thermometers. The thermometers should register equally. Take temperatures in each room two or three feet off the floor and near the center. Doors to rooms should be left in their normal positions; closed or open. Let the system operate about 30 minutes before taking thermometer readings.
3. If you find some of the rooms are too cool (in the cooling mode), or too warm (in the heating mode), partially close dampers to outlets in these rooms. Make any adjustments in one room at a time. It is best to start with the room that contains the thermostat.

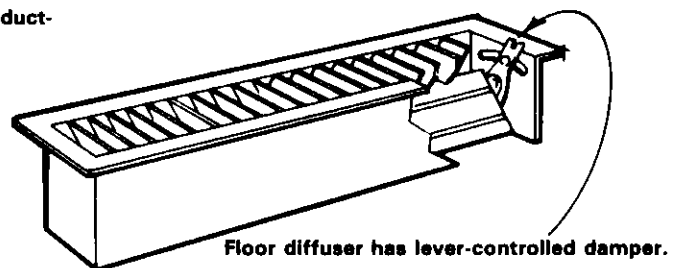
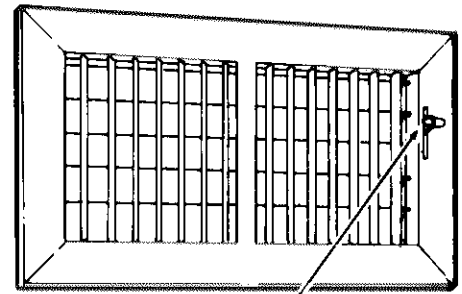
CAUTION: Only move dampers a very small amount at any one time. Never make a large adjustment in the damper position or close dampers completely as this will reduce system air flow and can cause system damage.

4. As air delivery is reduced at some outlets, it automatically increases at others. So after air has been reduced to rooms that need less conditioning, allow the system to run for 30 minutes or more. Then check temperatures again; the formerly uncomfortable rooms will have become conditioned more to your requirements.
5. Continue to make very slight adjustments to the dampers until rooms reach the temperature balance you want. Be sure to allow enough time for the temperatures to stabilize after you make each adjustment. Also, check temperatures in each room each time, because as you cut the delivery to one room, you can never be sure which other rooms will receive the resulting gain.

Adjusting damper in supply air duct.



Where dampers are in supply ducts, adjust them; leave diffuser dampers wide open. If there are no dampers in the ducts, adjust the dampers in the diffusers.



NOTE - Never completely close dampers or diffusers

NOTES ON OPERATING COSTS

1. DOORS AND WINDOWS

Keep windows and doors closed as much as possible. Unconditioned air, humidity, noise and dust belong outside.

2. FIREPLACES

Fireplaces provide a nice setting and pleasant atmosphere, however, fireplaces require a great deal of air for combustion and create a strong updraft through the chimney. Be sure the fireplace damper is shut when the fire is completely extinguished, and the fireplace is not in use.

3. EXHAUST FANS

Kitchen, bath and utility exhaust fans are a necessity, however, keep in mind that they also remove conditioned air from the house. Their use should be kept at a minimum in order to reduce heating/cooling costs.

4. OTHER HOME APPLIANCES

Keep in mind that washers, dryers, ovens and other home appliances can add heat and humidity to your home. For example, you might consider washing and drying clothes in the morning or evening in the cooling months to avoid adding heat to your home air during peak cooling hours. Venting your clothes dryer to the outside will help keep from adding heat and humidity to the inside air.

5. THERMOSTAT ADJUSTING

Your thermostat is a precision instrument, designed to automatically control your heating and cooling system. For best results select a comfortable setting and do not change the thermostat except when absolutely necessary.

6. NIGHT SETBACK

While night setback thermostats have been popular fuel saving devices for oil, gas and electric furnaces, they may not save fuel on conventional heat pump systems. Keep in mind that the heat pump produces an average of 2.5 times as much heat with a KW of electricity as does a resistance electric auxiliary heater at 45°F. When night setback is used, the temperature is normally allowed to drop 10 to 15°F at night. Standard night setback thermostats will operate the heat pump and auxiliary electric resistance heat to restore temperature to normal, in the morning. Thus it can cost more KW to restore heat than was saved by night setback. This depends on both power rates and other local factors. (Consult your local power company on electric rates and demand metering.)

Lennox does offer a night setback thermostat, Flexstat™, that works economically in heat pump applications. This thermostat is designed for heat pump use and is the best way to enjoy night setback cost savings. It will operate the heat pump and only minimum required amounts of electric resistance heat when restoring temperature to normal in the morning.

7. OUTDOOR THERMOSTAT

Outdoor thermostats are available for use with supplement electric heaters. These thermostats divide the control of the heaters and are pre-set to operate only the portion of electric heat needed at any given outdoor temperature.

8. DEMAND METERS

Some power companies use demand meters and your peak demand helps determine your electric rate. Outdoor thermostats properly adjusted for your installation can hold unnecessary resistance auxiliary heat off the line except when absolutely needed.

SERVICE AGREEMENT

Your Lennox dealer can offer you a very desirable Planned Service program to keep your comfort system in peak operating condition year after year.

You and your independent Lennox dealer agree to a number of scheduled (Planned) service calls. Each Planned Service call includes equipment inspection, lubrication and adjustment.

PLANNED SERVICE GIVES YOU:

- Peak, trouble-free system performance
- Greater operating economy
- Fewer emergency calls and breakdowns
- Less inconvenience
- Longer equipment life
- Preferential emergency service
- Peace of mind from planned maintenance by experts



Get the full PS story from your independent Lennox dealer.