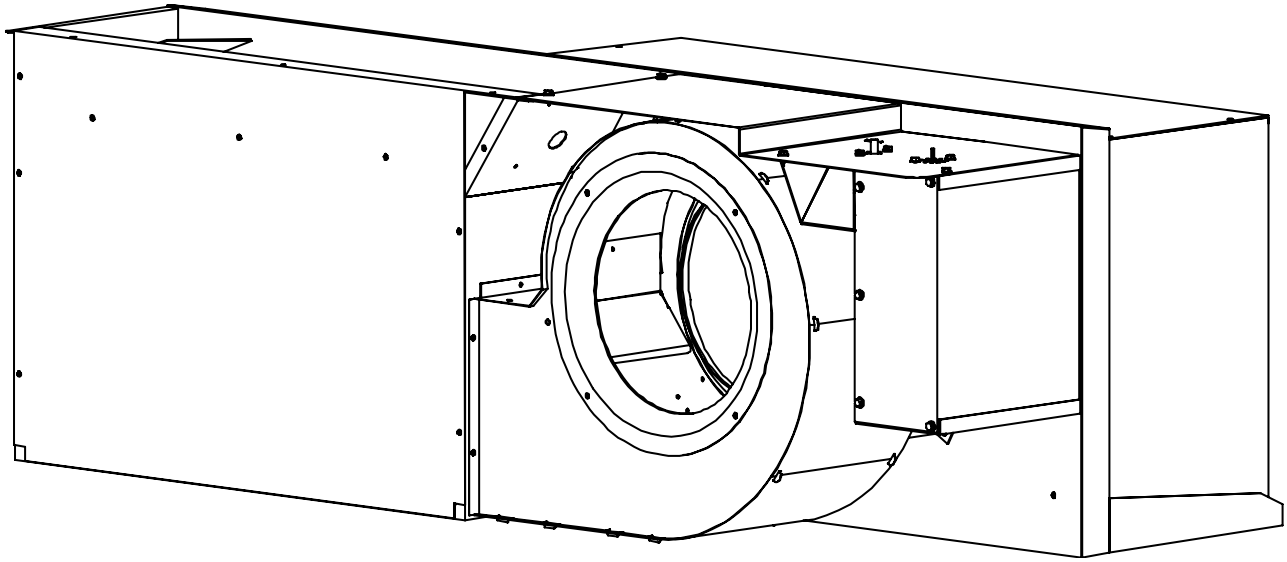
EAEE SERIES UPFLOW PACKAGED TERMINAL AIR CONDITIONER (PTAC)

INSTALLATION & OPERATION MANUAL



IMPORTANT:

READ AND SAVE THESE INSTRUCTIONS. INSTALLATION AND WIRING MUST BE IN ACCORDANCE WITH CEC, NEC AND LOCAL ELECTRICAL CODES.

EAEE Heat/Cool

GENERAL INFORMATION

The Applied Comfort EAEE PTAC is designed and built for through-the-wall installation in either new or existing buildings. The self-contained refrigerant system delivers cooling. Resistance heaters provide the heating. Additionally, the EAEE heat pump delivers reverse cycle refrigerant heat when the outdoor temperature is moderately cool.

WARNING: To avoid property damage, bodily injury or death, ensure power is disconnected before any service is attempted. Repairs should be made by qualified service personnel only. The chassis must be installed in accordance with the Authority Having Jurisdiction, and all Local and National Codes, including the National Electrical Code, and the Canadian Electrical Code, as applicable.

FOR EFFICIENT OPERATION

Air Filter

IMPORTANT: An improperly maintained air filter, or not using a filter at all, will void the warranty.

Keep air intake filter clean. Units use a washable air filter located in the filter retainer the front panel of the of the wall sleeve and is true to the Original Equipment Manufacturer's size of 18.5" wide x 12" high and 0.4" thick. The filter is a wall sleeve / front panel component and is not provided with the PTAC chassis. If it is a replacement situation and the original filter needs replacing or is not even present, the filter is available to order as Part No. ACCEAAIRFILTER.

Washable air filters can be cleaned with soap and water. Inspect and clean the filter a least once a month or more often as conditions dictate. Replace as necessary. A dirty, clogged filter reduces the efficiency of the system. It can also cause erratic performance of controls and can result in damage to the motor and compressor.

IMPORTANT: Always ensure the air filter is present and properly secured in place. Always reinstall the air filter, front panel, and the two screws as described above. This will prevent unintended or unauthorized air filter removal and ensure safe operation of the unit.

Clean Coils

As part of regular servicing, clean the condenser coil, and evaporator coil at least annually, or more often as dictated by the severity of the particulates and pollutants circulating in the outdoor and indoor operating environments.

Unimpeded Outdoor Airflow

Do not block off the outside air flow to the unit. The condenser air inlet and outlet must be free of obstructions and of any external influence that would cause the hot discharged condenser air to be re-circulated back into the air intake. Outdoor air is drawn into the condenser section via the air intake on the right side of the rear grill. Hot condenser air is rejected at an angle out of the left portion of the rear grill thereby minimizing air re-circulation back into the intake. Paper, leaves, dirt, or other material blocking airflow, or fouling the condenser coil can impair efficiency and cause serious damage to the compressor.

Oiling

The motors are permanently lubricated and do not require re-oiling.

Unimpeded Indoor Airflow

Ensure that drapes, bed, bedspread, and furniture etc. do not block the indoor air discharge and intake air openings, causing a restricted air flow condition through the indoor air handling section of the unit. Do not place articles on discharge grille – especially liquids.

Reducing Load

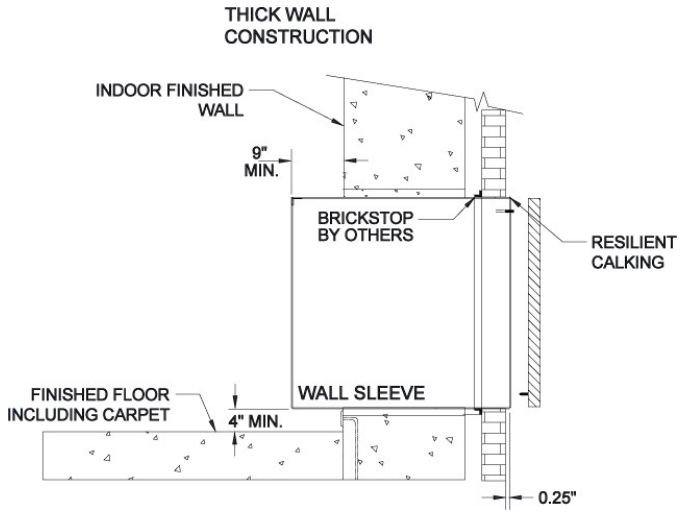
To reduce the cooling load, draw drapes or blinds in the summer, to reflect direct rays from the sun.

To reduce the cooling and heating load, keep windows and doors closed when operating the unit.

WALL SLEEVE CABINET INSTALLATION:

Install the wall sleeve cabinet in strict accordance with the wall sleeve installation instructions, which are supplied with the wall sleeve.

IMPORTANT: The wall sleeve must be installed with a 1/4" to 1/8" per foot slope downward toward the outside to ensure proper water drainage out the back edge of the wall sleeve during overflow conditions. The specified slope corresponds to a 1/4 to 1/8 bubble on a carpenter's level. The wall sleeve must also be level from side-to-side.



ELECTRICAL WIRING AND RECEPTACLE

WIRE SIZING

A single outlet branch circuit from the main electrical panel to the receptacle in the wall should be used. Wire sizing shall be in accordance with the minimum circuit ampacity as declared on the unit Rating Plate for the specific chassis. Wire sizing must also take into account any distance from fuse box or breaker panel to receptacle to prevent excessive voltage drop in undersized wires.

IMPORTANT: Low voltage to the unit will cause compressor starting problems and decrease the performance and reliability of the compressor.

BRANCH CIRCUIT PROTECTION

The Current Rating of branch circuit protection using a Time Delay Fuse or HACR circuit breaker should also be as declared on the unit Rating Plate for the specific chassis being installed.

PLUG AND RECEPTACLE

230-208 Volt units are furnished with either a NEMA 6-15P, NEMA 6-20P, or NEMA 6-30P, non-locking plug depending on the unit ampacity, and hence will require the corresponding NEMA receptacle to be field-provided.

All 115 Volt units are furnished with a NEMA 5-15P, or 5-20P non-locking plug as applicable. The respective plug will require a NEMA 5-15R or 5-20R receptacle to be field-provided.

All 277 Volt units are furnished with a NEMA 7-20P, 20 Amp non-locking plug and hence will require a NEMA 7-20R receptacle to be field-provided.

NOTE: 277 Volt units are considered to be permanently connected per the National Electrical Code. The plug and cord are considered to be a "connector of convenience" in order to facilitate easy removal of the chassis for servicing. The plug and cord are suitably protected when using the **non-optional** 277 volt sub-base.

230-208 and 115 volt units are true "cord connected units" and are provided with a service cord of the LCDI (Leakage Current Detection Interrupter) type, intended to be plugged in to a wall receptacle. The LCDI cord is capable of detecting some of the common faults experienced with aging power cords, and when those faults are detected, interrupts power to the cord before a hazardous condition can evolve.

WARNING: To avoid property damage, bodily injury or death, the unit must be used on a grounded power supply only. The unit will be grounded through the service cord plug and matching receptacle as long as the branch circuit remains grounded.

DO NOT:

- Change the length of the service cord.
- Bend the connector blades or otherwise alter service cord plug configuration.
- Use extension cords.

CHASSIS INSTALLATION

Unpack heat/cool chassis from shipping carton. Check for any shipping damage. Spin the blower wheels manually to confirm free rotation. Inspect refrigerant piping to ensure there is no damage. Report any shipping damage to the carrier immediately.

Check the interior of the installed wall sleeve. Clean out any dirt or debris that may have accumulated. Replace air seals that are damaged or missing.

Heating/Cooling Chassis Installation

1. Slide the chassis into the wall sleeve until firmly seated against the seals.
2. There is a vertical air seal at the rear of the unit to isolate the air path between the condenser inlet and outlet. These seals will engage and "seal" against the rear grille. However, in some cases, such as when an extra deep wall sleeve is used, or some other sleeve variation is encountered that prevents the vertical seal from engaging against the outdoor grille, steps must be taken to add anti-recirculation baffles to prevent hot condenser air from short-circuiting back into the air intake via the void space created behind the outdoor grill.
3. If the unit is equipped with **electronic controls** and touchpad, locate the 24 Volt wiring harness coiled beneath the control box. The harness is employed if a remote 24 Volt AC wall thermostat will be used. If so, connect the multi-wire 24 volt wiring harness to the mating plug protruding beneath the control box, as applicable, following the detailed instructions on the particular wiring diagram affixed to the specific unit being installed. Insulated crimp-on connectors are provided at the end of every connection lead to facilitate connections/insulation.
4. If the unit is equipped with **mechanical knob controls** this variation cannot be adapted to work with a remote thermostat.
5. Set the manual damper operator in the open or closed position depending on the desired operation.
6. Plug the heat/cool chassis cord into the power receptacle located either in the sub-base or the wall, as applicable.
7. Install the filter in the front panel and secure the front panel with the two retaining screws located in its upper corners.

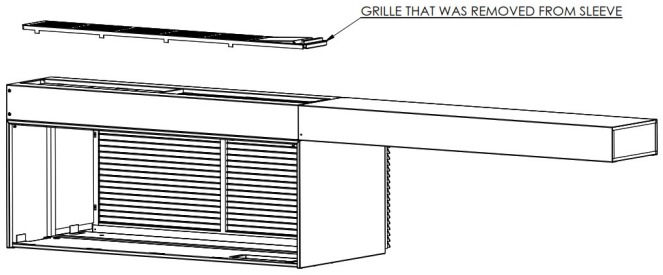
WARNING: Operating the unit without the front panel in place can expose the user to hazards from rotating parts. Always remember to re-install the filter and ensure the front panel is in place and secured with the wo retaining screws after servicing. Operating the unit without an air filter in place can damage the unit.

8. Wipe unit cabinet/wall sleeve to remove dirt, etc.
9. The unit is now ready for operation, when supplied with power from the distribution panel and wired to a remote thermostat (if applicable).

Optional Air Duct Kit

The The EA series has been designed and certified for use with an optional external duct kit. The unit is certified for use with the Applied Comfort Products ACCEA_EXTENDAIR duct kit only, so no other duct apparatus should be used with the unit. The intent of the duct kit is to duct a portion of the conditioned air into one adjacent room.

The EA has been designed to use a 4.5" tall by 10.5" wide insulated Duct Plenum fastened to the top of the unit, which connects to a maximum 48" long insulated Extension Duct of the same size, and requires a field-supplied Air Terminal Grille at the end of the Extension Duct having a minimum free area of 30 square inches. The outlet grille must have non-adjustable louvers so they cannot be inadvertently closed. The 48" duct extension piece can be cut to the desired length. To ensure safe and proper operation it is imperative that all installation instructions shipped with the duct kit are strictly followed. What is presented in these instructions is a basic overview only.



The Duct Plenum is designed to be reversible (shown with right discharge) and is permanently capped at one end. A decision is made whether to duct right or left and the Duct Plenum is positioned with the opening directed accordingly. A strip of blank-off plates (not shown) is supplied with the kit to allow the installer to snap off and adjust the number of active plates required

to divert a given amount of air to the adjacent room via the Extension Duct.

Using the maximum number of plates to restrict the plenum outlet air opening results in a 60% physical blockage that will divert up to up to 50% of the total air flow to the adjacent room.

Warning: To preserve the safety of the design, do not attempt to restrict the outlet grille opening beyond the 60% maximum allowable, provided by the blank-off plates.

The detailed installation instructions shipped with the duct kit will provide more detail regarding percent air diversion relative to number of plates used.

IMPORTANT: Insertion of blanking plates to increase the air restriction to the main room to and drive more air down the duct must always move in a direction from Left to Right. Proper operation of the unit depends on it. In other words, there will always be at least two out of the five rows of louvers open at the left end of the plenum air discharge grille to pass air into the main room. Ducting air right or left will not change this requirement.

START-UP CHECKLIST

Note: Once the unit is installed, it should be checked for proper function by qualified service personnel before turning it over to the User.

- Circuit breakers, wire size, and electrical connections tight and correct
- Filter clean and properly in place
- Condenser air inlet and outlet free of obstructions and no short-circuiting of condenser air
- Unit operated for 20 minutes to prove stability
- Controls operation OK
- Unit installed in compliance with all codes and ordinances
- All panels in place and secured with required fasteners
- Mylar overlay applied to cover up touch pad for 24 Volt Remote Thermostat installations.
- Work area clean and free of debris
- Owner or operator instructed on control operation and routine maintenance.

USER CONTROLS - GENERAL

The EAEE series is available with advanced-function electronic controls with membrane switch type keypad, or, with conventional knob-actuated electromechanical controls.

ELECTRONIC CONTROLS

The chassis incorporating electronic controls is factory-shipped with an active keypad control and display mounted directly to the control panel. The unit functions are controlled by the user by pressing the keys on the keypad, and reading the display. However, the unit also has the latent ability to be field-converted by qualified service personnel for use with a field-supplied 24 volt AC wall thermostat. These instructions will address both unit-mounted control operation, and remote 24 volt AC wall thermostat operation.

CONTROL AT THE UNIT, KEYPAD/DISPLAY

THE KEYPAD CONTROL

Become familiar with the keypad keys as shown in Figure 1.

Display
Red light emitting diodes (LEDs) display the actual temperature of the air entering the unit at floor level. The display can also be used to indicate the desired set point temperature for room comfort. It is important to remember that the temperature displayed is the temperature sensed at the unit's indoor air inlet and can be significantly different from the bulk room temperature at a distance from the unit.

On/Off Key
Each press of the key toggles the unit from an OFF state to an ON state or from an ON state to an OFF state. Heating and cooling functions, as well as the display, and all indicating LEDs except for the fan indicators, are enabled or disabled with this key. When toggled OFF, the control preserves only two modes active; fan-only, and room freeze protection.

Fan Key
Each press of the Fan Key cycles the fan through three modes of operation; Low Speed, High Speed and Auto. Small green LEDs will indicate the mode. The On/Off key need not be ON to operate the fan and set fan speeds. Auto Mode will cycle the fan on and off, and

determine the fan speed, in conjunction with the heating or cooling demand.

Warmer Key
Pressing the Warmer Key will cause the display to show the set point temperature for 3 seconds, and then increases room temperature by 1 degree for every subsequent press of the key.

Cooler Key
Pressing the Cooler Key will cause the display to show set point temperature for 3 seconds, and then decreases room temperature by 1 degree for every subsequent press of the key

°F/°C Key
This key toggles the display between Fahrenheit and Celsius temperature modes, and affects all displayed temperatures.

Heat Key
The Heat Key toggles the unit in and out of heating mode for every press of the key, provided the On/Off Key is ON.

Cool Key
The Cool Key toggles the unit in and out of cooling mode for every press of the key, provided the On/Off Key is ON.

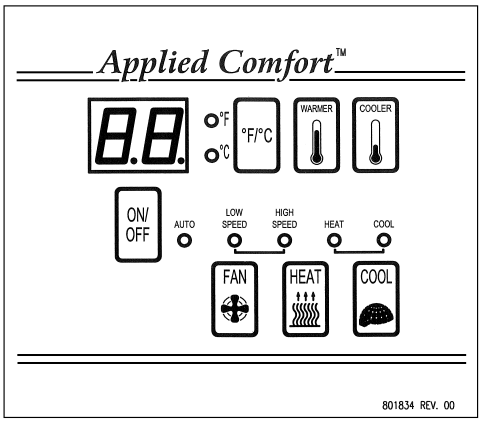


Figure 1
OPERATION USING KEYPAD

When the unit is first plugged in, or when recovering from a power outage, there will be a random 5 to 15 second delay before the electronic control powers up. This minimizes the large electrical surge that would otherwise occur if all units in a building started up at the same time.

To Initiate Heating or Cooling Mode
Press On/Off Key to turn on the LED display and commence full functionality. Push the °F/°C Key to obtain the desired temperature scale. Press the Heat or Cool key as applicable, and the current indoor temperature will be shown on the display.

Set Desired Temperature
Press Cooler or Warmer key as applicable. Each push of the key increases or decreases the set point temperature by 1 degree, as applicable.

Set Fan Mode
Press Fan key to cycle through the fan settings as indicated by the small green circular LEDs. Select continuous High Speed fan, continuous Low Speed fan, or Intermittent Fan by selecting Auto. Auto cycles the fan on and off with the calls for heating or cooling. Auto also sets fan speed according to the amount of heating or cooling demanded. In Auto mode, the fan will start up periodically to establish airflow; air temperature will be sampled, and then the fan will shut off again if there is no demand.

Disable Heating or Cooling, but Initiate Fan-Only
Press On/Off key to turn off LED display. Press Fan key to cycle through the fan settings as indicated by the small circular LEDs. Select continuous High or Low speed. Do not select Auto, as it will turn the fan off.

CONTROL AT THE WALL THERMOSTAT

CONVERSION TO 24V REMOTE THERMOSTAT

Except for the wall thermostat and thermostat cable, everything is included with the unit to field convert a keypad-operated unit to 24 Volt AC wall thermostat operation by qualified service personnel. Specific conversion instructions are detailed on the wiring diagram affixed to each particular unit to be converted. Conversion involves accessing the high voltage wiring compartment and changing a DIP switch setting on the electronic board. Once the DIP switch setting has been changed, operation will be in remote thermostat mode as soon as power is restored to the control.

WARNING: The conversion procedure involves exposure to high voltage electrical circuits in the control box in order to make the necessary change to the DIP switch, and must be performed by qualified service personnel. Failure to do so could result in property damage, personal injury or death. Disconnect electric power to the unit before servicing.

A factory-supplied 24 Volt wiring harness is provided with every unit to facilitate connection to the wall thermostat wiring. One end has a multi-pin connector which mates with a connector exiting the unit. The other end has preinstalled butt splice connectors, which play a dual role in insulating any unused connectors, and can also be used to make the wire connections for wires that are used.

The final step is to apply the masking label provided, to cover up the keypad. The keypad and display will be disabled and no longer be available for control. The masking label markings instruct the user to go to the wall thermostat for controlling the unit.

COMPATIBLE THERMOSTATS

The features of the 24 VAC wall thermostat chosen will dictate the extent of the features available from the unit.

Electric Heat / Cool units can accommodate the following thermostats in either manual or automatic changeover:

- Single Stage Heat/Cool, Single Speed Fan
- Single Stage Heat/Cool, Two Speed Fan

Note: The thermostat selection must be verified to ensure its control logic will always energize a Fan output (G) on a call for heat – also known as an Electric Heat Type Thermostat.

General:

All the above can have single speed or two speed fan control.

The wiring diagrams affixed to the units will guide the specific connection strategies for the particular thermostats used.

THERMOSTAT LOCATION:

Proper functioning of the thermostat depends on accurate room temperature sensing. Be conscious of locating the thermostat where temperatures near the thermostat are not representative of room temperature. For example, do not install the thermostat where it is subjected to direct sunlight, other sources of heat, or to cold drafts, including air discharged from a supply air register. A common error is forgetting to seal the hole in the wall where the thermostat cable passes through, directly behind the thermostat body. Air bleeding from behind the wall can drastically affect the temperature sensed by the thermostat.

REMOTE THERMOSTAT OPERATION

When the unit is first plugged in, or when recovering from a power outage, there will be a random 5 to 15 second delay before the electronic control powers up. The keypad will be totally disabled once the DIP switch has been set for remote mode. The unit will obey the commands from the thermostat only.

The thermostat will automatically maintain the temperature in the room, based on the setting pre-set by the user. If the thermostat has only single fan speed capability, a decision will need to be made as to whether the fan will always run in high speed or low speed, and then the appropriate fan speed wiring connection can be made at the unit.

All the internal control features of the electronic board remain active, except for keyboard and display interface functions and room temperature sampling. Room temperature is detected at the location of the wall thermostat, and is usually a much more accurate representation of bulk room temperature. The thermostat used may have advanced features beyond the basic functions described below. Consult your thermostat Installation and Operating Instructions for further information.

In addition to controlling room temperature, the room thermostat is also used to select whether the unit is to be in heating mode, or cooling mode, or in automatic changeover between the modes. It also determines whether the system is to be ON or OFF, and whether the fan is to run continuously, or to cycle with heating or cooling demand.

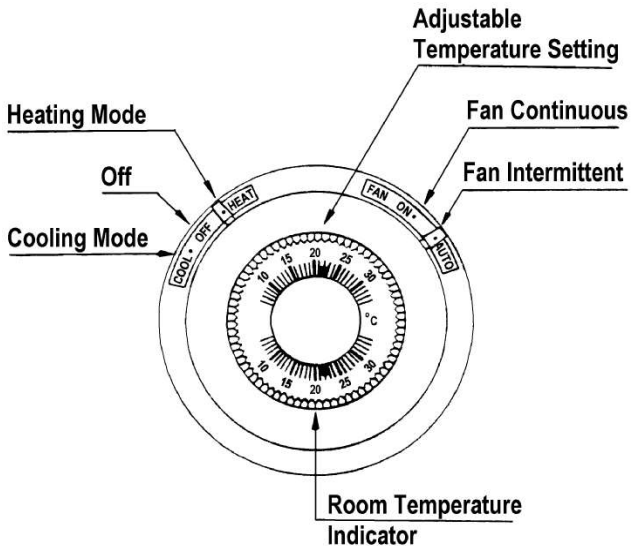


Figure 2

Once a comfortable temperature setting is established, no other adjustments are necessary, except for fan speed, which may or may not be adjustable on your particular thermostat.

CAUTION: One side of the unit's 24-volt control system is grounded. When wiring the thermostat, care must be taken not to ground the wires, or drive a nail through the thermostat wire bundle, thereby potentially burning out the transformer.

WALL THERMOSTAT OPERATION	
Heat	Sets the unit into heating mode. Initiates heating when room temperature falls below set point.
Off	Disables heating and cooling modes, but allows control of fan.
Cool	Sets the unit into cooling mode. Initiates cooling when room temperature rises above set point.
Auto (not shown)	Found on automatic changeover thermostats only. Allows the thermostat to decide whether it should be in the heating or cooling mode. Usually a 4 F° differential or "deadband" will exist between heating and cooling set points to prevent inadvertent rapid switching between modes.
Temperature Setting	Establishes the "set point", or desired room temperature.
Fan On	Synonymous with "Fan Continuous". Fan will continue to run after the heating and cooling function has cycled off. Fan will continue to run even when mode switch is in Off position.
Fan Auto	Synonymous with "Fan Intermittent". Fan will cycle on and off with the heating cycle or cooling cycle, and will not operate between cycles.

ADDITIONAL FEATURES:

Some additional features of the Electronic Control units are as follows:

Room Freeze Protection
This feature is enabled when the unit is shipped from the factory. The feature can be disabled by qualified service personnel. If power is available to the unit, and regardless of whether it is turned ON or OFF, the unit will automatically supply heat to the room with the fan running at low fan speed if the room temperature falls to 50°F (10ºC). The heat will turn off when the room temperature reaches 55°F (13ºC). For the feature to work, the unit must be configured with an electric heater. The feature is enabled whether the unit is configured for keypad or remote thermostat. The protection remains active when the unit is OFF, for either keypad or remote thermostat application, as long as the unit is plugged in, power is available, and a heat source is configured in the unit and is working.

Compressor Short-Cycle Protection
If the electronic control shuts the compressor down for any reason, a 3 minute time delay will elapse before the compressor is allowed to re-start. This prevents compressor overload during re-start due to unequal system refrigerant pressures.

Indoor Coil Freeze Protection
Control of frost on the evaporator coil due to low indoor loads, or cold outdoor ambient temperatures, is provided.

Low Outdoor Temperature Lock-out
If the outdoor temperature is too low for proper compressor operation, cooling operation will be suspended, and also heat pump heating operation (if applicable) will switch over to electric resistance

heating mode automatically if there is a demand for heat, until the outdoor temperature rises to an acceptable point, depending on the application.

Indoor Temperature Limiting (Keypad Control Only)
Using the keypad control and display, high and low temperature limits can be established to prevent the user from entering set point temperatures colder or warmer than what the property manager or hotel operator may desire. The temperature limit choices are as follows:

Configuration Code	Low Limit °F (ºC)		High Limit °F (ºC)	
R1	63	(17)	86	(30)
R2	65	(18)	86	(30)
R3	65	(18)	90	(32)
R4	67	(19)	88	(31)
R5	67	(19)	92	(33)
R6	69	(20)	90	(32)
R7	69	(20)	72	(22)

The procedure to set the limits is as follows:

Depress the On/Off key, the °F/°C key, and the Warmer key simultaneously for 5 seconds to enter the limit setup mode. The Warmer and Cooler keys will scroll through the R-values indicated in the above table. Once the desired R-value has been obtained on the display, press the On/Off key to accept the change, and then press it again to effect the change and restore the normal display.

ELECTROMECHANICAL DIAL CONTROLS

Room temperature is controlled on both heating and cooling by the temperature control knob. Clockwise rotation decreases the temperature in the room. Counter-clockwise rotation decreases the temperature in the room.

Rotate the "Temperature" dial a small amount at a time in the direction that you wish the temperature to go. Moving the dial more than ½" at a time may over-compensate, leading to an extreme hot or cold situation. Once a comfortable setting is determined and set, no other adjustments are necessary.

Over-adjusting the thermostat will not increase the rate at which the unit will heat or cool the space; it is merely an on-off switch that responds to temperature. Fan speeds in heating and cooling operation are controlled by a "Fan Speed" knob. Rotate the knob to the right of "0" for cooling operation, and to the left of "0" for heating operation. Rotation of the knob changes fan speed as follows:

3 = High Speed 2 = Low Speed 1 = Low Speed

ATTENTION: When operating in cooling mode, if the compressor is shut off by rotation of either dial, then wait for 3 minutes before re-starting the compressor.

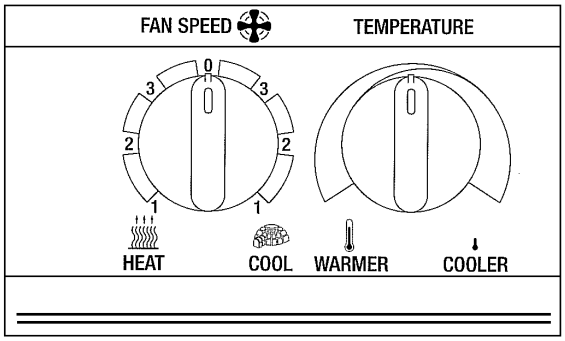


Figure 3

Fan Cycling Switch:

The chassis includes a continuous/intermittent fan feature. Located on the left bottom corner of the control box is a rocker switch used to switch between continuous and intermittent fan operation.

With the rocker switch in the **"Continuous"** position, as indicated by the label on the front of the unit, the indoor fan will continue to operate as long as the unit is switched on in either the heating or cooling mode. The fan will operate continuously at the fan speed selected.

With the rocker switch in the **"Intermittent"** position, and the unit in cooling mode, the indoor fan will operate only when there is a call for cooling by the adjustable thermostat. Similarly with the unit in heating mode, the indoor fan will operate only when there is a call for heating in order to satisfy the heat setting on the adjustable thermostat.

It is recommended that continuous fan operation be selected in the cooling mode to avoid excessive temperature "swings" in the conditioned space.

The most effective indoor temperature sensing and highest comfort levels are achieved when room air is being drawn continuously across the sensing bulb of the unit thermostat. If complaints of large temperature swings in the room are experienced, then switch the unit to continuous fan operation.

The front cover must be removed to access the switch.

Built-in Operating Delay

An adjustable time delay is provided in the control circuitry to manage the changeover from reverse cycle heat to resistance heat, and is factory-set for 3.5 minutes. As a result, in some cases there will be a 3.5 minute delay for reverse cycle heat to initiate. This will occur in the following situation:

When the unit is first plugged in, or if the unit has just been switched to heating mode, reverse-cycle heat (compressor operation) will be delayed for 3.5 minutes. However, the unit will provide heat for the first 3.5 minutes via the resistance heater. Once the initial 3.5 minutes has elapsed, if there is still a call for heat from the thermostat, and if the outdoor temperature is in heat pump range, the compressor will start and cycle normally on the room temperature thermostat within the unit. No further time delays are incurred provided the switch remains in the heating position.

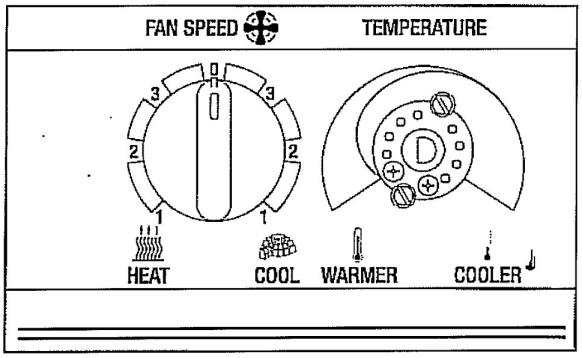
There is no time delay in the cooling mode.

Indoor Coil Freeze Protection
Control of frost on the evaporator coil due to low indoor loads, or cold outdoor ambient temperatures, is provided.

Emergency Heat Switch (EAEE Heat Pump Only)
If the compressor fails and there is heating demand, heat pump units will have a rocker switch that can switch the unit into electric resistance heat mode, until a repair can be made. Located on the right bottom corner of the control box is a rocker switch used to switch between normal and emergency heat operation. The front cover must be removed to access the switch.

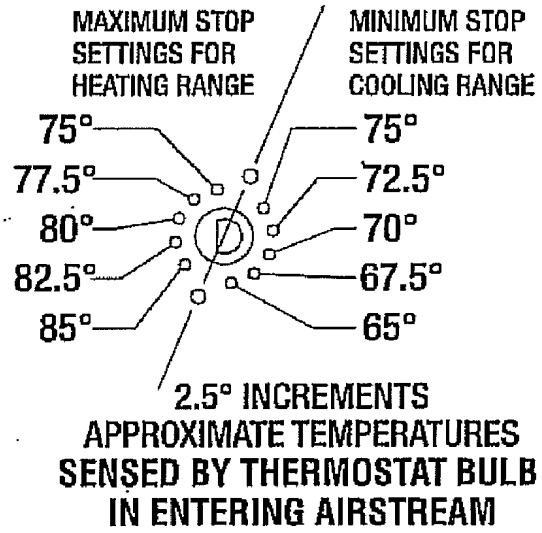
Low Outdoor Temperature Lock-out
If the outdoor temperature is too low for proper compressor operation, cooling operation will be suspended, and also heat pump heating operation (if applicable) will switch over to electric resistance heating mode automatically if there is a demand for heat, until the outdoor temperature rises to an acceptable point, depending on the application.

Thermostat Temperature Limiting Feature



The purpose of temperature limiting is to allow the property owner to control the maximum and minimum temperature that an end-user can obtain during operation of the unit, and can be an important energy saving feature. This is accomplished by limiting the thermostat knobs range of rotation between preset limits set by the property owner. The unit is shipped from the factory allowing a wide range of rotation. Altering the range of rotation is easily done.

Remove the thermostat knob by pulling it with sufficient force—DO NOT PRY. Turn the knob over and observe the plastic rib coming off the side of the knob stem. The rib is designed to engage limiting stop screws that can be arranged to limit the maximum and minimum set-point temperatures for the thermostat. On the dial plate, just below the thermostat shaft you will notice two Phillips head screws (with washers) in "Standard Position" in the above illustration. This allows a wide range of thermostat rotation, representing a range of temperatures between approximately 18°C and 29°C (65ºF and 85ºF). The left screw in Standard Position can be removed and re-inserted in four alternate holes moving in a clockwise direction in order to reduce the maximum allowable set-point temperature for heating. Similarly, the right screw can be relocated in four alternate holes moving in a counter-clockwise direction to increase the minimum allowable set-point for cooling. Moving to the next screw location alters the set point limit by about 1.4ºC (2.5ºF), as shown in the illustration below.



For example, moving the left screw clockwise 4 positions over from Standard Position limits the maximum heating set-point temperature to 29.4ºC – (4 x 1.4ºC) = 23.8ºC (85ºF – (4 x 2.5ºF) = 75ºF). Similarly, moving the cooling set-point right screw counter-clockwise 2 positions over from Standard Position limits the minimum temperature to 18.3ºC + (2 x 1.4ºC) = 21.1ºC (65ºF + (2 x 2.5ºF) = 70º F). Therefore in this example roughly speaking, the end user cannot heat the room to greater than 23.9°C (75ºF) nor cool the room to less than 21.1°C (70ºF) .Experimentation may be necessary to obtain a desirable setting. Keep in mind that the actual thermostat temperature sensing occurs at the sensing bulb in the return air stream, sensing air being pulled in through the bottom of the front panel near the floor.

NOTE : IF THE ROOM TEMPERATURE IS STILL NOT SATISFACTORY AT THE COOLEST THERMOSTAT SETTING, THEN COMPLETELY REMOVE THE RIGHT HAND LIMITING STOP SCREW.

Important: Before reinstalling the knob, manually turn the thermostat shaft so that the rib under the knob will locate in between the stop screws once the knob is installed. Failure to follow this step may cause an unintended temperature range to arise.

SERVICE/REPAIR INFORMATION:

Service and repairs shall be completed by authorized service personnel.

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized.

Work shall be undertaken under a controlled procedure to minimize the risk of a flammable gas or vapour being present while the work is being performed.

All maintenance staff and others working in the local area shall be instructed on the nature of the work being carried out. Work in confined spaces shall be avoided.

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO, fire extinguisher adjacent to the charging area.

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance. The following checks shall

be applied to installations using FLAMMABLE REFRIGERANTS:

- The actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed.
- The ventilation machinery and outlets are operating adequately and are not obstructed.
- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
- marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.
- Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment, so all parties are advised.
Initial safety checks shall include:

- that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.
- that no live electrical components and wiring are exposed while charging, recovering or purging the system.

that there is continuity of earth bonding.

Ventilated Areas
Ensure that the area is open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

Repairs
During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is necessary to have an electrical supply to equipment during servicing, then a permanent operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that the apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.
Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use. Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.
Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.
NOTE: The use of silicon sealant can inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

Cabling
Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also consider the effects of aging or continual vibration from sources such as compressors or fans.

Detection
Under no circumstances shall potentially sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. The following leak detection methods are deemed acceptable for all refrigerant systems. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate or may need re-calibration. (Detection

equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipework.

NOTE Examples of leak detection fluids are:

- bubble method,
- fluorescent method agents.

If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

Removal / Evacuation of Refrigerant

When breaking into the refrigerant circuit to make repairs - or for any other purpose - conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

a) safely remove refrigerant following local and national regulations.
b) purge the circuit with inert gas.
c) evacuate (optional for A2L).
d) purge with inert gas (optional for A2L).
e) open the circuit by cutting or brazing.
f) The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

Charging Procedure

In addition to conventional charging procedures, the following requirements shall be followed:

• Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
• Cylinders shall be kept in an appropriate position according to the instructions.
• Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
• Label the system when charging is complete (if not already).
• Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Decommissioning / Recovery

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its details. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task commences.

a) Become familiar with the equipment and its operation.
b) Isolate the system electrically.
c) Before attempting the procedure, ensure that:
   - Mechanical handling equipment is available, if required, for handling refrigerant cylinders.
   - All personal protective equipment is available and being used correctly.
   - The recovery process is always supervised by a competent person.
   - recovery equipment and cylinders conform to the appropriate standards.
d) Pump down the refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
f) Make sure that cylinder is situated on the scales before recovery takes place.
g) Start the recovery machine and operate in accordance with instructions.
h) Do not overfill cylinders (no more than 80 % volume liquid charge).
i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
k) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible,
cooled before recovery occurs. The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, FLAMMABLE REFRIGERANTS. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt. The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders. If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that FLAMMABLE REFRIGERANT does not remain within the lubricant.

The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Labelling
Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label **shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.**

SYMPTOM	CAUSE	CHECK / CORRECTION
No Cooling	System switch set to OFF or HEAT on wall thermostat (remote thermostat units only)	Switch to COOLING or AUTO
	System set to OFF at Keypad	Press On/Off key to turn unit ON, then press the COOL Key.
	System set to HEAT at Keypad	Press the COOL Key.
	Faulty thermostat (remote thermostat units only).	Test and replace if necessary.
	Fuse or circuit breaker tripped.	Replace or reset as necessary.
	Cord not plugged in.	Plug in.
	LCDI cord plug head safety circuit tripped	Press reset button on back or side of LCDI plug, as applicable, to restore power to the unit. If LCDI trips again and will not stay reset, contact qualified service personnel.
	Defective keypad, display, or main board.	Contact qualified service personnel.
	DIP switch improperly set on electronic board.	Contact qualified service personnel. Review specific wiring diagram.
	Indoor room temperature is below set point.	If comfort is not yet achieved, lower the thermostat setting (if using a remote thermostat), or depress the COOLER key on the keypad (in non-remote), as applicable.
	Outdoor temperature too low	Unit is outside range of operation. Outdoor temperature must warm up before cooling operation can resume.
No Heating	System switch set OFF on wall thermostat (remote thermostat units only)	Switch to HEATING or AUTO
	System set to OFF at Keypad	Press On/Off key to turn unit ON, then press the HEAT Key.
	Faulty thermostat (remote thermostat units only).	Test and replace if necessary.
	Fuse or circuit breaker tripped.	Replace or reset as necessary.
	Cord not plugged in.	Plug in.
	LCDI cord plug head safety circuit tripped	Press reset button on back or side of LCDI plug, as applicable, to restore power to the unit. If LCDI trips again and will not stay reset, contact qualified service personnel.
	Defective keypad, display, or main board.	Contact qualified service personnel.
	Indoor room temperature is above set point.	If comfort is not yet achieved, raise the thermostat setting (if using a remote thermostat), or depress the WARMER key on the keypad (for non-remote), as applicable.
	Defective heater.	Contact qualified service personnel.
	DIP switch improperly set on electronic board.	Contact qualified service personnel. Review specific wiring diagram.
	One-shot thermal fuse is blown.	Contact qualified service personnel.
	Automatic reset high limit control will not reset.	Contact qualified service personnel.
	DIP switch improperly set on electronic board (hydronic units only).	Contact qualified service personnel. Review specific wiring diagram for addressing “Normally Open” vs. “Normaly Closed” Hydronic Valves.
	Broken, shorted, loose, or incorrect wiring.	Contact qualified service personnel.
	Compressor is defective (heat pump only)	Remove front cover and locate the emergency heat switch. Switch to EMERGENCY HEAT as directed by the label located adjacent to the switch – this will activate the electric heater if there is a heating demand. Contact qualified service personnel to deal with the compressor repair.
	Compressor is defective (heat pump only, remote thermostat only)	The wall thermostat may have an EMERGENCY HEAT setting. Select this switch setting - this will activate the electric heater if there is a heating demand. Contact qualified service personnel to deal with the compressor repair.

No Fan Operation	System switch set to OFF on wall thermostat (remote thermostat units only)	Switch to LOW FAN, HIGH FAN, or FAN ON, as applicable.
	With system set to OFF on keypad, Fan is set to AUTO at Keypad.	Press FAN key to cycle through FAN LOW, FAN HIGH, and AUTO. Select the fan setting as desired. FAN AUTO will keep the fan off if the ON/OFF key is set to OFF.
	Defective fan motor	Contact qualified service personnel.
	Faulty thermostat (remote thermostat units only).	Test and replace if necessary.
	Fuse or circuit breaker tripped.	Replace or reset as necessary.
	Cord not plugged in.	Plug in.
	LCDI cord plug head safety circuit tripped	Press reset button on back or side of LCDI plug, as applicable, to restore power to the unit. If LCDI trips again and will not stay reset, contact qualified service personnel.
	Defective keypad, display, or main board.	Contact qualified service personnel.
Remote Thermostat does not Properly Control Room Temperature, Causes Unit to Run Continuously, or Causes Abnormal Cycle Times	Unwanted source of heating or cooling is near the wall thermostat causing the thermostat to sense a temperature other than room temperature (remote thermostat units only).	Eliminate the unwanted heating or cooling source or move the wall thermostat. See if thermostat is too close to a supply air register. Seal the hole in the wall where the thermostat cable passes into the thermostat.
	Wall thermostat body may be heating up due to impingement of direct sunlight, at a certain time of day.	Relocate thermostat, provide shade for the thermostat, or just live with the problem if it occurs for only a short time during the day.
	Defective thermostat.	Test and replace if necessary.
	DIP switch improperly set on electronic board.	Contact qualified service personnel. Review specific wiring diagram.
Keypad controls do not Properly Control Room Temperature, Causes Unit to Run Continuously, or Causes Abnormal Cycle Times in Heating or Cooling Mode	Air seals in wall sleeve are worn out, or completely missing. This allows outdoor air to be blended with indoor return air and the indoor temperature probe detects the erroneous blended temperature.	Take whatever steps are necessary to correct chassis-to-sleeve leakage. Contact qualified service personnel.
	Defective keypad, display, or main board.	Contact qualified service personnel.
Compressor **Short-Cycles**	Restricted outdoor coil.	Check for dirt or other outdoor coil restriction. Clean as necessary.
	Recycling of outdoor air	Check for inadequate outdoor air installation clearances. Outdoor coil may not be sealed against outdoor grille causing hot discharge air to be re-circulated back into the condenser air intake. Contact qualified service personnel to correct condition.
	Recycling or blockage of indoor air causing frosting of indoor coil. Frosting of indoor coil can cause compressor short-cycling.	Ensure that curtains or other obstructions are not blocking the indoor air inlet, indoor air outlet, or creating a pocket to short-circuiting indoor air from the outlet grille to the return air intake.
	Dirty air filter.	Clean or replace
	Dirty evaporator coil.	Clean as necessary.
	Fan motor(s) operating intermittently, rotating slowly, or not at all.	Contact qualified service personnel.
	Faulty thermostat (remote thermostat units only).	Test and replace if necessary.
	Indoor coil freezing.	See “Indoor Coil Frosts”
	Indoor room temperature too cold.	Compressor will cycle on and off at the command of indoor coil frost control thermostat.
	Outdoor temperature too cold.	Compressor is not intended to operate at cold outdoor temperatures. Compressor operation will be locked out until the outdoor temperature rises, or compressor will cycle on and off at the command of the frost control devices.

	Defective keypad, display, or main board.	Contact qualified service personnel.
Unit Trips Fuse or Circuit Breaker	Shorted or incorrect wiring.	Contact qualified service personnel.
	Fuse or breaker setting too low.	Check nameplate fuse size.
	Low voltage	Check voltage with unit running and ensure it is within nameplate limits.
	Seized, noisy, or slow running compressor.	Contact qualified service personnel.
	Defective keypad, display, or main board.	Contact qualified service personnel.
Indoor Coil Frosts	Dirty air filter.	Clean or replace.
	Dirty indoor coil.	Clean as necessary.
	Blower motor operating intermittently, rotating slowly, or not at all.	Contact qualified service personnel.
	Recycling or blockage of indoor air causing frosting of indoor coil. Frosting of indoor coil can cause compressor short-cycling.	Ensure that curtains or other obstructions are not blocking the indoor air inlet, indoor air outlet, or creating a pocket to short-circuiting indoor air from the outlet grille to the return air intake.
	Defective suction line thermostat.	Contact qualified service personnel.
	Low refrigerant charge.	Look for telltale signs of low charge. During cooling operation, check frosting pattern starting from defrosted condition. If the whole indoor coil face frosts uniformly at the same time, it indicates that the unit has insufficient indoor airflow. If frost works its way up the face of the evaporator during operation over time, it indicates low charge. Contact qualified service personnel.
Heater Output Intermittent or Insufficient	Faulty thermostat.	Test and replace if necessary.
	Automatic reset high limit control defective.	Replace high limit.
	Dirty air filter.	Clean or replace
	Dirty evaporator coil.	Clean as necessary.
	Defective main board	Contact qualified service personnel.
	Blower motor operating intermittently, rotating slowly, or not at all.	Check if blower wheel or shaft is being rubbed or experiencing external friction. Check free rotation of the motor shaft. Check voltage to motor. Check motor capacitor. Check for miswiring. Replace motor, if necessary.
Water Drips from Unit	Sleeve not properly mounted.	Check sleeve for the required ¼" per foot pitch down from indoor to outdoor side and level side-to-side. Readjust as required.
	Condensate drain plugged.	Clean condensate drain.
	Evaporator drain pan leaky.	Inspect, repair or replace drain pan as required.
	Unusually high moisture content in the indoor and/or outdoor air.	Under certain indoor and outdoor conditions, excessive condensate is generated beyond the rate at which the unit can reject to the outdoor air stream by evaporation.
	Drain holes plugged in bottom edge of sleeve on outdoor side.	Inspect and clear blockage.