GREE CANADA

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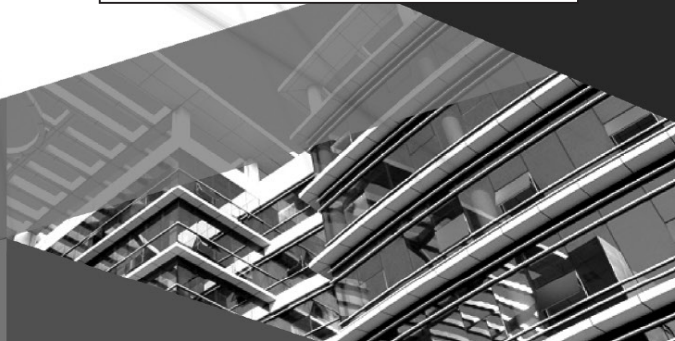
Packaged Terminal

Owner's Manual

GAA09AF-D6DRNB5A
GAA12AF-D6DRNB5A
GAA15AF-D6DRNB5A

IMPORTANT : Please read this manual carefully before using the appliance and keep it for future reference.

INSERT MANUAL BARCODE HERE



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If it is necessary to install, move or service the heat pump, please contact your dealer or local service center first. The appliance must be installed, moved or serviced by qualified technicians. Failure to do so may result in serious damage or personal injury, or even death.

When refrigerant leaks or must be discharged during installation, maintenance or disassembly, it must be handled by certified professionals or in accordance with local laws and regulations.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities or lack of experience and knowledge, unless they are given supervision or instruction in its use by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the unit.

SAFETY GUIDELINES

SAFETY SYMBOLS DESCRIPTION

The following symbols are used throughout this manual to indicate immediate or potential hazards. It is the owner's responsibility to read and follow all safety information and instructions accompanying these symbols. Failure to heed safety information increases the risk of serious injury or death, property damage and/or product damage.

DANGER	This symbol indicates an imminently hazardous situation that, if not avoided, will cause severe personal injury, death, or substantial property damage.
WARNING	This symbol indicates a potentially hazardous situation that, if not avoided, can cause severe personal injury, death, or substantial property damage.
CAUTION	This symbol indicates a potentially hazardous situation that, if not avoided, will or can cause minor personal injury or property damage.
NOTE	This symbol is accompanied by tips and/or relevant information that are essential to the proper operation of the equipment.

EXCEPTION CLAUSES

The manufacturer will not assume any liability when personal injury or property damage is caused by the following reasons:

1. Damage the product due to improper use or misuse of the product.
2. Modifying, altering, maintaining or using the product with other equipment without complying with the manufacturer's instruction manual.
3. After verification, the product defect is directly caused by corrosive gas.
4. After verification, the defects are caused by mishandling during product transportation.
5. Operation, repair, maintenance of the unit without complying with the instruction manual or related regulations.
6. After verification, the problem or dispute is caused by the quality specifications or performance of parts and components produced by other manufacturers.
7. The damage is caused by natural disasters, bad operating environment or force majeure.

CONFORMITY AND RANGE

CAUTION:

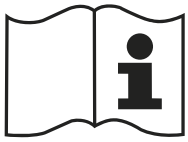
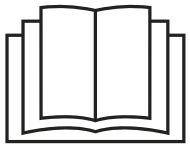
- Please read this manual carefully before using the appliance and keep it for future reference.
- Use the appliance only in accordance with the instructions in this booklet. These instructions are not intended to cover all possible conditions and situations. As with any household appliance, common sense and caution are therefore always recommended for installation, operation and maintenance.

SAFETY GUIDELINES

REFRIGERANT SPECIFICATIONS

A special refrigerant circulates in the system to achieve the air conditioning operation. The refrigerant used is fluoride R32, which is particularly environmentally friendly. The refrigerant is flammable and odorless. In addition, it can lead to an explosion under certain conditions, but the flammability of the refrigerant is very low. It can only be ignited by fire.

Compared to conventional refrigerants, R32 is a non-polluting refrigerant that does not harm the ozone layer. The influence on the greenhouse effect is also lower. R32 has very good thermodynamic characteristics which make it very energy efficient. The appliances therefore need less filling.

	Appliance is filled with flammable R32 gas.		Before installing the appliance, read the "Installation Guide" section thoroughly.
	Before using the appliance, read the "Operation Guide" section thoroughly.		Before repairing the appliance, read the "Service Guide" section thoroughly.

⚠ WARNING:

- Appliance filled with flammable R32 gas.
- Please read the manual before installation, operation and maintenance.
- The appliance must be installed, operated and stored in a room with a floor area greater than 4 square meters (43 square feet).
- The air conditioner must be stored in a room without continuously operating equipment (for example, an open flame, a gas ignition device in operation or an electric heater in operation).
- The appliance must be stored in a well-ventilated area where the size of the room matches the area of the room as specified for operation.
- The appliance must be stored in such a way as to prevent mechanical damage.
- Ducts connected to the unit must not contain any ignition sources.
- Ensure that required ventilation openings are not obstructed.
- Do not puncture or burn the unit.
- Be aware that refrigerant can be odourless.
- Do not use any means to accelerate the defrosting process, or cleaning, other than those recommended by the manufacturer.
- Servicing should only be carried out in accordance with the manufacturer's recommendations.
- Please contact the nearest service center when repairs are required. When servicing the air conditioner, personnel must strictly follow the instructions provided by the manufacturer and it is forbidden for non-professionals to repair the air conditioner.
- Compliance with national gas regulations is mandatory.
- Read the specialist's manual.

SAFETY GUIDELINES

SAFETY PRECAUTIONS

⚠ WARNING:

- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities or lack of experience and knowledge, unless they are given supervision or instruction in its use by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the unit.
- Cleaning and maintenance should not be performed by unsupervised children.
- Before operating the appliance, check that the power specifications comply with those shown on the nameplate.
- Disconnect the power supply when cleaning the appliance. Failure to do so may result in electric shock.
- Do not pull on the power cord to unplug or move the unit.
- Do not insert or remove the power plug with wet hands.
- Please use a grounded power supply. Make sure the grounding is reliable.
- If the power cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons to avoid any hazard.
- In the event of an anomaly (e.g. a burning smell), unplug the unit immediately and contact your local dealer.
- If the unit is not to be used for some time, it is recommended to switch it off and remove the power plug or disconnect all power.
- Do not spray water on the indoor unit. This could cause electric shock or malfunction.
- Do not use heating equipment in the proximity of the packaged terminal.
- Do not use the appliance in a bathroom or laundry room.
- Keep away from sources of fire, as well as flammable and explosive objects.
- Do not place or hang wet objects that could drip onto the appliance.
- Do not attempt to repair or disassemble the appliance yourself.
- Do not insert any objects into the unit.
- Do not throw sundries into the air duct. If sundries is introduced into the air duct, please contact professionals to take care of the matter.
- Do not use an extension cord.
- Fuse specification on main board: T3.15 AH 250 V (unit: 208/230 V), T3.15A 350 VAC (unit: 265 V); maximum current passes.
- The appliance must be installed in accordance with national wiring regulations.
- The external static pressure is 0 MPa for the packaged terminal in test position.
- Minimum clearance between the appliance and a combustible surface: 1.5 meters.
- Concerning the electric heating mode, the electric heater is installed behind the indoor evaporator. Please refer to the service manual for further details.
- If a STATIONARY APPLIANCE is not equipped with a POWER CORD and plug, an omnipolar disconnecting switch with a contact separation of at least 3 mm in all poles must be connected in the fixed wiring.
- Do not block the air inlet or outlet.

PRODUCT FEATURES

This top-quality appliance has many interesting features that differ from those of standard packaged terminal models. Owners need to familiarize themselves with these features in order to fully understand the appliance's operation and capabilities.

INTELLIGENT SELF-DIAGNOSIS

This unit is equipped with an on-board computer that uses real-time diagnostics to extend its service life. The control board, located behind the front panel, features an LED indicator that flashes an error code if the unit has detected any anomaly. In many cases, the unit will automatically clear the problem and continue to operate without interruption. In some cases, however, the error cannot be resolved and the unit must be repaired. In this case, the "Fx" failure mode appears on the digital display.

MEMORY CAPABILITY

This appliance is also equipped with a built-in memory. In the event of a power failure, all control settings (setpoint, mode, fan speed, on/off and configuration) are stored. This means that, when power is restored, the unit restarts in the mode (and configuration) it was in at the time of the power failure.

NOISE REDUCTION

The unit is equipped with two fan motors, with the outdoor fan motor running at minimum speed for 10 seconds before compressor start-up to reduce compressor noise.

RANDOM COMPRESSOR RESTART

To avoid power surges after a power outage (due to simultaneous start-up of several units), the compressor is equipped with a random restart delay function from 2 minutes 45 seconds to 3 minutes 15 seconds. Each time the unit is plugged in or the power is restored, a random restart of the compressor occurs.

COMPRESSOR PROTECTION

To prevent compressor short-circuits and maximize compressor service life, the compressor is subject to a random start-up delay of 3 minutes and a minimum running time of 3 minutes.

AUTOMATIC ROOM FREEZE PROTECTION

This function automatically prevents the room temperature from becoming too cold, which could cause water pipes to freeze. If the unit is configured to activate the frost protection function (which it is by default), every time the unit is powered up, if it detects a temperature below 4 °C (40 °F), the fan motor and electric heater will start up and heat the room until it reaches 10 °C (50 °F). If frost protection is not required, change the configuration switch to deactivate this function (see the section on unit configuration).

AUTOMATIC DEFROST PROTECTION (FOR HEAT PUMP MODELS ONLY)

When the outdoor temperature becomes too cold (approximately -2°C / 28°F) and the unit can no longer heat effectively with the compressor, the unit automatically switches to electric heating. The unit will then heat with electric heating until the outdoor temperature rises sufficiently (approximately 4°C / 40°F) for the compressor to be used again.

AUTOMATIC QUICK WARM-UP (FOR HEAT PUMP MODELS ONLY)

If the room temperature falls 5 degrees below the set temperature, the reverse-cycle heater switches

off and the electric strip heater starts up for one cycle, until heating is assured.

LED INDICATORS AND BUTTONS

The keypad features **ON/OFF**, **WARMER**, **COOLER**, **MODE**, **FAN SPEED** and **TIMER** buttons. It also features LEDs corresponding to mode, fan speed and setpoint, to indicate unit status. The LEDs Next to *DRY*, *FAN*, *COOL* and *HEAT* indicate the active operating mode. The LEDs next to *HIGH*, *LOW* and *AUTO* indicate the selected fan speed. The LED above the power button is the unit's on/off status indicator. If the unit is on, the light is blue. If the unit is off, the light goes out.

CONFIGURATION OF THE FAN TO OPTIMIZE THE SELECTED APPLICATION

The unit can be optimized for the selected application by configuring the fan to run in continuous mode, or to cycle on and off at the same time as the compressor and electric heater. In cycle mode, the fan continues to run for some time after the compressor or electric heater has stopped, to remove residual heat or cool from the coil.

UNIT CONFIGURATION

There are a number of configuration options, via DIP switches and the numeric keypad, which allow you to configure the unit to suit your exact application. See the section on device configuration for more details. Below you'll find the configuration options not previously mentioned:

- **Temperature Unit in Fahrenheit or Celsius:** The unit can display in either °F or °C.
- **Indoor Temperature Sensor Biasing:** Optimizes room temperature sensor reading to suit your exact application (one for cooling and another for heating).
- **Emergency Heat (for heat pump models only):** Disables compressor in *HEAT* mode.
- **Setpoint or Room Temperature Display:** The unit can be configured to display only the room temperature OR the setpoint, in both *HEAT* and *COOL* modes. See the section on unit configuration for more details.
- **Setpoint Range Limitation:** The unit can be configured to limit the setpoint range. The display will always show the full range of setpoints, but the control setpoint will be limited to the configured minimum and maximum setpoints selected. See the section on unit configuration for further details.
- **Energy Management:** Sometimes known as "Front Desk Control", this input allows you to manually deactivate the unit from another location. If the device detects a voltage of 24 V AC on this input, it automatically switches off. If no voltage is detected on the input, the unit will operate normally.
- **Wall Thermostat Control:** A wired wall thermostat can be connected to the unit. In this case, the unit must be configured to deactivate the keypad. See the section on wired inputs and unit configuration for further details.

PRE-INSTALLATION INFORMATION

OPERATION ENVIRONMENT

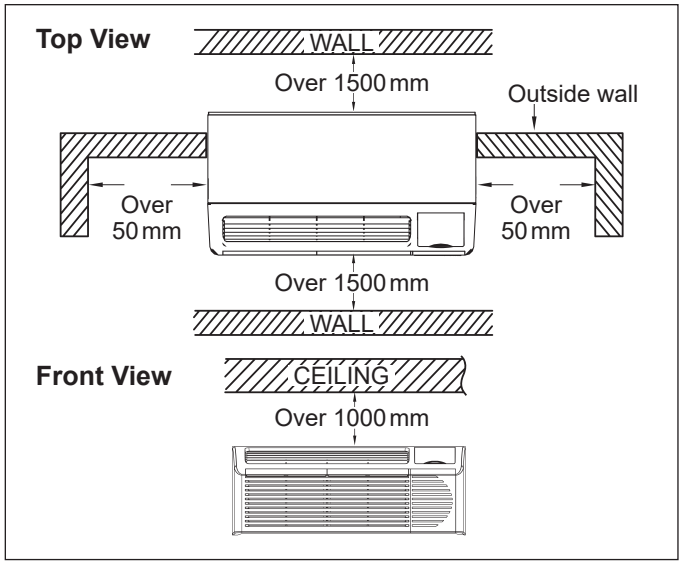
OPERATING TEMPERATURE RANGE		
	Indoor Side DB/WB (°C / °F)	**Outdoor Side DB/WB (°C / °F)**
Maximum Cooling	26.7 / 19.4 (80 / 67)	46.1 / 23.9 (115 / 75)
Maximum RC Heating	26.7 / – (80 / –)	23.9 / 18.3 (75 / 65)
Maximum Electric Heating	25 / – (77 / –)	25 / – (77 / –)

- Ambient temperature range (indoor temperature) for cooling is 18 to 26.7 °C (64 to 80 °F).
- Ambient temperature range (indoor temperature) for heat pump is 14 to 26.7 °C (57 to 80 °F).
- Ambient temperature range (outdoor temperature) for cooling is 18 to 46.1 °C (64 to 115 °F).
- Ambient temperature range (outdoor temperature) for heat pump is 3.9 to 24 °C (39 to 75 °F).
- Ambient temperature range (indoor, outdoor temperature) for electric heating is -7 to 25 °C (19 to 77 °F).

INSTALLATION LOCATION RECOMMENDATIONS

- Choose a location where there are no obstructions around the appliance and where the plug is accessible.
- Take into account the required clearance according to the following diagram.

The distance between the appliance (300 mm) and surrounding obstacles must comply with the following requirements: over 1000 mm (top side), over 50 mm (left side), over 50 mm (right side), over 1500 mm (front) and over 1500 mm (rear).



SAFETY CONSIDERATIONS

For your safety, the information in this manual must be followed to minimize the risk of fire, explosion, electric shock, property damage, personal injury or loss of life.

Failure to comply with the following warnings may result in injury, death and/or property damage.

⚠ WARNING: Personal injury and/or property damage hazard

- This unit must be properly installed in accordance with the installation instructions before use.
- Immediately repair or replace all electric service cords that have become frayed or damaged.
- Unplug or disconnect the unit at the fuse box or circuit breaker before carrying out any repairs.

PRE-INSTALLATION INFORMATION

GENERAL INFORMATION

This packaged terminal offers a high level of quality in terms of performance, workmanship, durability and appearance, as it heats and cools the occupied air space all year round.

This manual provides information to facilitate installation, operation and maintenance.

All models are designed for through-the-wall installation. Separate installation instructions are supplied with all accessory components.

BEFORE YOU BEGIN

Read these instructions carefully and in full.

Important: Keep these instructions for use by local inspectors.

Important: Observe all applicable codes and regulations.

NOTE TO INSTALLER

Be sure to leave these instructions with the owner.

NOTE TO OWNER

Keep these instructions for future reference. Be sure to note the model and serial number of the unit. Model and serial numbers can be found on the serial number plate attached to the unit. These numbers are required for servicing the unit.

ELECTRICAL DATA

⚠ WARNING: Electric shock hazard

DO NOT alter the cord or plug, and do not use an extension cord. Failure to observe this warning may result in injury or death and/or damage to property.

POWER CONNECTION OPTIONS

The appropriate power cord accessory kit is determined by the voltage and amperage of the branch circuit.

The unit is not supplied with a power cord (or hard wiring kit). A power cord kit must be ordered to connect the unit to the power outlet. If the unit is to be hard wired, a hard wiring kit must be ordered.

Important: For 265 V units, if the accessory power cord option is selected, the cord must not exceed 5.5 meters (18 feet) in length and must be plugged into the 265 V accessory electrical subbase.

Make sure your electrical outlet matches the plug's pin configuration and is within easy reach of the service cord.

All wiring, including outlet installation, must comply with NEC standards and local codes, ordinances and regulations. National standards require the use of an arc fault or leakage current detection device on all 208/230 V power cords. Make sure the cord is suitable for the installation.

WIRE INFORMATION

WIRE SIZE

Use the recommended cable size shown in the following table and install a single branch circuit. All wiring must conform to local and national codes. All units are designed to operate on a single branch circuit.

NOTE: Use copper conductors only.

SUGGESTED BRANCH CIRCUIT WIRE SIZES *	
Nameplate (A)	**Wire Size (AWG)**
7.0 to 12	14
12.1 to 16	12
16.1 to 24	10

LEGEND:

AWG: American Wire Gauge

*: Single circuit from main box. Based on copper cable at 60°C temperature rating.

GROUNDING

For safety and protection, the unit is grounded by the service cord plug or by a separate ground wire for hard-wired units. Ensure that the branch circuit or general outlet is properly grounded.

VOLTAGE SUPPLY

Check the voltage supply at the outlet. For satisfactory results, the voltage must always be within the limits indicated on the nameplate.

CORD-CONNECTED UNITS

The 250 V socket provided on site must match the plug of standard 208/230 V units and be within reach of the service cord. Cord-connected 265 V standard units require an accessory electrical subbase for operation. Refer to the table below for the appropriate socket and fuse type.

POWER CORD PROTECTION

The power cord of 230/208 V units is fire-protected. Power is automatically cut off when unsafe conditions are detected. Power can be restored by pressing the reset button on the plug head.

Once the 230/208 V models have been installed, an operational check must be carried out using the TEST/RESET buttons on the plug head.

NOTE: 265 V models do not feature this function, as they require the use of an electrical subbase.

Socket Type						
Amps	15	20	30	15	20	30
Rated Volts	250	250	250	265	265	265
Time-delayed Type Fuse (or HACR circuit break)	15	20 *	30	15	20	30

LEGEND:

HACR: Heating, Air Conditioning, Refrigeration

*: Can be used for 15-amp applications.

INSTALLATION

- Proper installation is the responsibility of the installer.
- Product failure due to improper installation is not covered under the Warranty.

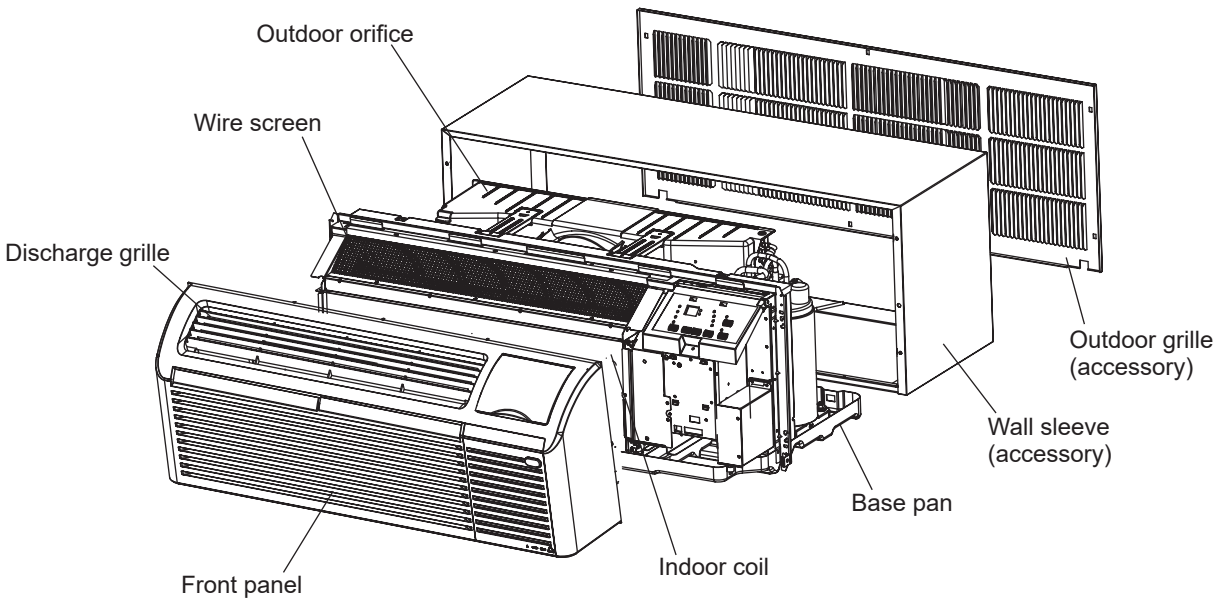
CHASSIS INSTALLATION

Units are supplied without wall sleeves. In applications where the unit is a replacement, we recommend the use of a GREE, General Electric or Friedrich wall sleeve.

These units can retrofit General Electric and Friedrich sleeves/grilles (make sure the outer grille is installed on the sleeve).

For all sleeve retrofit applications, ensure that the foam seals (factory-installed on the tube sheets) provide a good seal between the grille and the tube sheets of the outdoor coil. These foam seals provide a barrier that prevents air leaving the outdoor coil from mixing with incoming outdoor air (known as air recirculation).

⚠ **CAUTION:** For retrofit applications, the foam seals on the tube sheets of the outdoor coil must ensure a tight seal between the coil and the grille, otherwise there will be loss of performance and premature damage to the main components. Failure to do so may result in damage or malfunction of the unit.



RETROFIT SLEEVE PREPARATION

Important: Carefully inspect the wall sleeve before installation. The manufacturer assumes no responsibility for costs or damage due to defects in the sleeve or improper installation.

⚠ WARNING: Electric shock hazard

Disconnect the unit from all power sources to avoid the risk of electric shock during installation. Failure to observe this warning may result in injury or death.

Remove any foam baffles installed on the competition's outdoor grille, if present. See Figure 1.

GENERAL ELECTRIC SLEEVES ONLY

- **Metal Sleeve:** General Electric metal sleeves are interchangeable with GREE wall sleeves. See Figure 2.
- **Plastic Sleeve:** Remove the bottom seal from the plastic sleeve. See Figure 3.

INSTALLATION OF A GREE OR CARRIER WALL SLEEVE USING A NON-GENERAL ELECTRIC GRILLE

This application has become more common due to pre-manufactured windows with built-in grilles or renovations where a GREE or Carrier sleeve is used with an existing non-General Electric grille.

The use of a GREE or Carrier wall sleeve with a non-General Electric grille requires the installation of an accessory baffle kit (see Figure 4), which ensures a good seal between the unit and the outdoor grille to prevent air recirculation.

Air recirculation is a major contributor to performance loss and premature damage to key components.

FIGURE 1

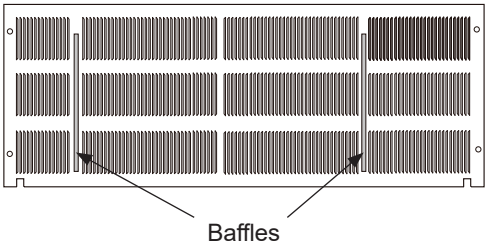


FIGURE 2

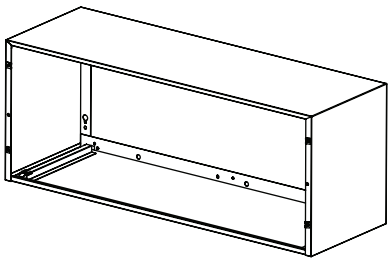


FIGURE 3

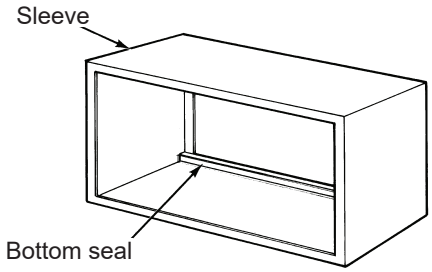
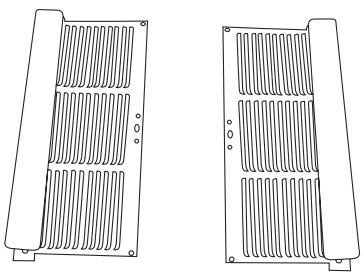


FIGURE 4



Note: Contact your equipment supplier to obtain the kit, which may differ from the model shown above.

INSTALL UNIT INTO WALL SLEEVE

1. Carefully remove the shipping tape from the front panel and vent door. See Figure 5.
2. Remove the shipping screw from the vent door, if present. See Figure 6.
3. Remove the front panel. See Figure 7.
4. Lift the unit and slide it into the wall sleeve until the foam seal rests firmly against the front of the sleeve.
5. Secure with the four screws supplied through the holes in the unit flange. See Figure 8.
6. Reinstall the front panel. See Figure 9.

⚠ **CAUTION:** If the tape and shipping screw are not removed, the fresh air vent door will not open and the vent door cable may be damaged. Failure to observe this warning may result in equipment damage or malfunction.

FIGURE 5

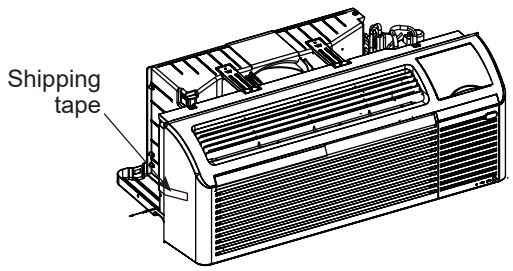


FIGURE 6

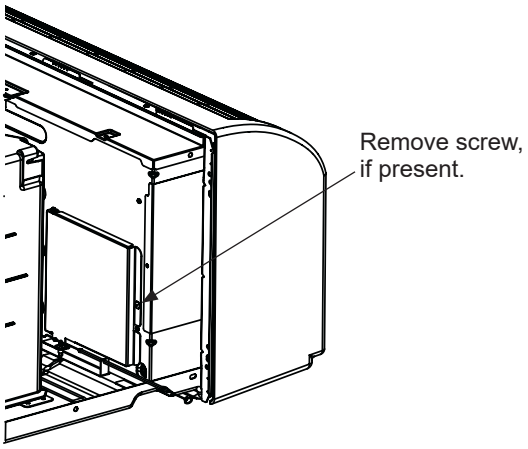
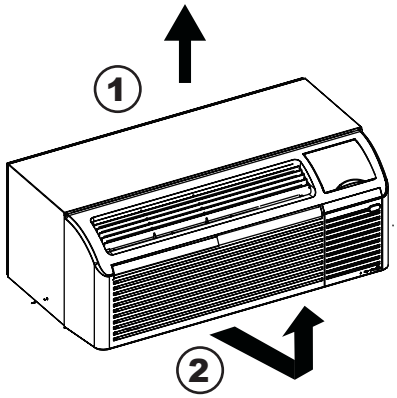


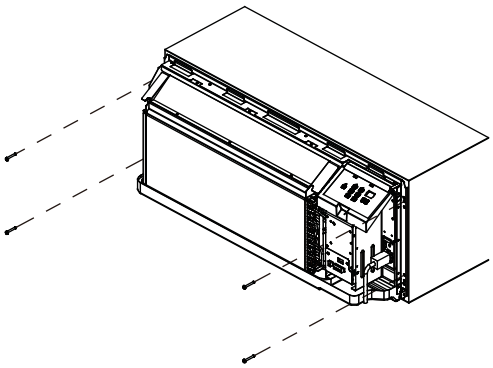
FIGURE 7



(1) Pull the bottom part to release the front panel from the tabs.

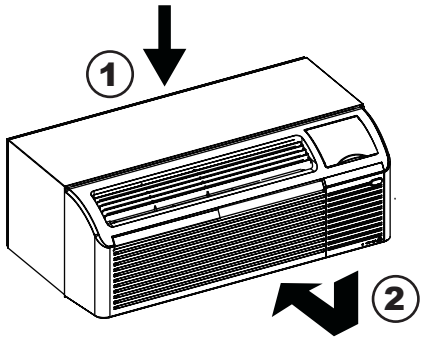
(2) Then lift.

FIGURE 8



Secure the unit.

FIGURE 9

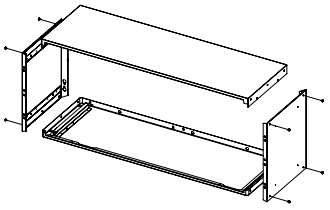
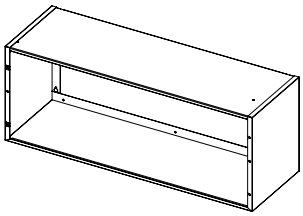
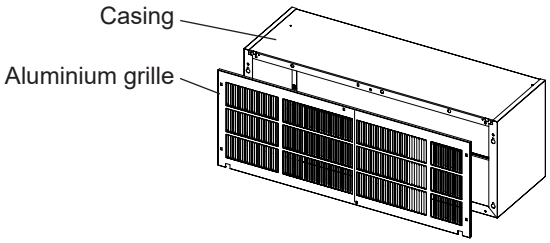


(1) Place the tabs over the top rail.

(2) Push the bottom part inwards until the panel snaps into place.

INSTALLATION

LIST OF ACCESSORIES (APPLICABLE CASING AND GRILLE)

Casing	Removable casing	TL12500210	 Secure with 8 screws.
	Whole casing	TL10500030	
Aluminum grille	TL12500180		 Fix the grille to the casing when it is used.

VENTILATION CONTROL

The ventilation control lever is located on the left-hand side of the unit, behind the front panel.

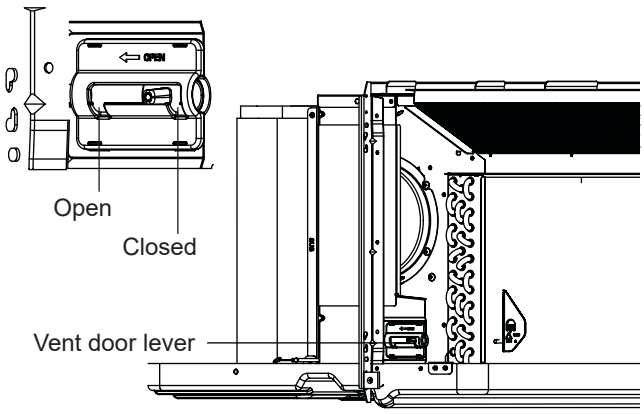
NOTE: Vent door shipping hardware must be removed before using the ventilation control lever. See installation instructions.

In the CLOSED position, only the air inside the room is circulated and filtered.

In the OPEN position, some outside air is drawn into the room. This reduces heating or cooling efficiency.

Tip: Leave the ventilation control in the CLOSED position. Room air is filtered and circulated.

FIGURE 13



ADJUSTING AIR DIRECTION

To adjust air direction:

1. Remove the front panel. See Figure 7.
2. Remove the screws holding the louver insert in place (from the back of the front panel). See Figure 14.
3. Turn the louver insert and rotate it 180°. See Figure 15.
4. Replace the louver insert.
5. Reinstall screws and front panel.

FIGURE 14

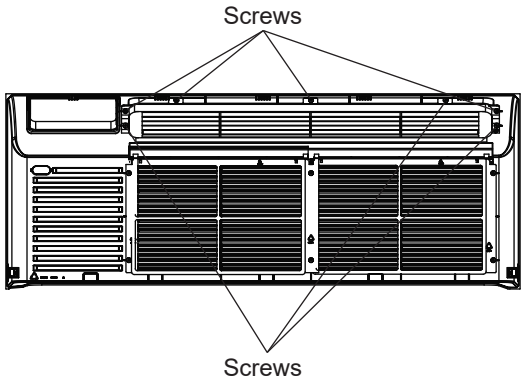
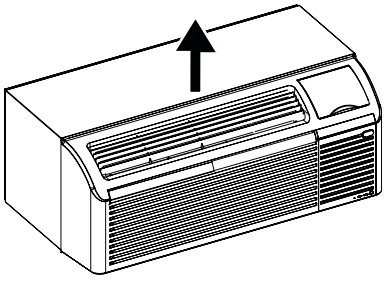
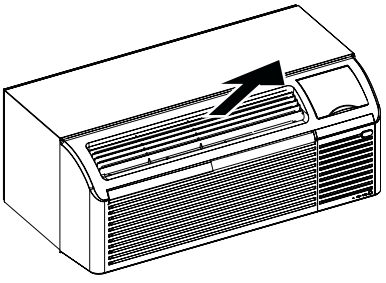


FIGURE 15

Upward air discharge



Outward air discharge (default)



SYSTEM CONFIGURATION

DIP SWITCHES

Auxiliary DIP switches are located behind the front panel, through an opening under the control panel.

To access, remove the front panel. See Figure 7.

DIP switches are accessible without opening the control box. The unit must be powered down to change their status.

Factory settings of DIP switches are DOWN. See the table further down for the functions of each DIP switch position.

FIGURE 16

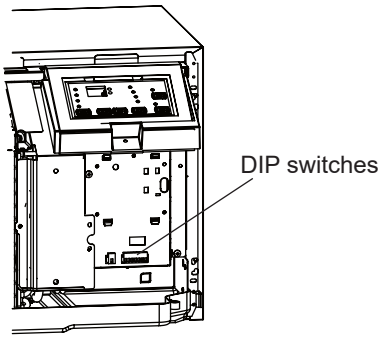
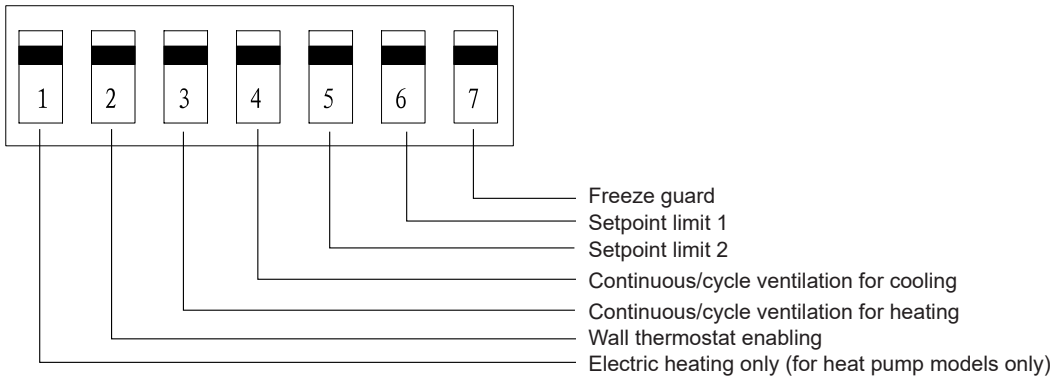


FIGURE 17



DIP SWITCH FUNCTIONS

#	UP Position		DOWN Position		Remarks	Default
1	Electric heating only		Heat pump		For heat pump model only.	DOWN
2	Wall thermostat enabled		Control panel enabled			DOWN
3	Continuous fan operation for heating		Cycle fan operation for heating			DOWN
4	Cycle fan operation for cooling		Continuous fan operation for cooling			DOWN
5 / 6	UP / UP 20 – 24 °C (68 – 75 °F)	UP / DOWN 17 – 28 °C (63 – 80 °F)	DOWN / UP 18 – 26 °C (65 – 78 °F)	DOWN / DOWN 16 – 30 °C (61 – 86 °F) (full range)	Two configurations (5 / 6) combined to determine setpoint range. When the setpoint limit is set, the display always shows the full range.	DOWN / DOWN 16 – 30 °C (61 – 86 °F)
7	Freeze guard disabled		Freeze guard enabled			DOWN

Electric Heating Only / Emergency Heat : This function is only available for heat pump units.

Wall Thermostat Enabling : A wired wall thermostat can be connected to the unit. If so, this switch must be set for wall thermostat use, before the wall thermostat can start controlling the unit.

Continuous or Cycle Fan Operation : Allows the fan to run continuously or cyclically when the unit is in *Heating* or *Cooling* mode.

- Continuous: This setting allows the fan to run continuously and circulate air even when the set temperature has been reached. This switch keeps the room temperature closer to the thermostat setting.
- Cycle: This setting allows the fan to start and stop at the same time as the compressor or electric heater. The fan stops shortly after the set temperature has been reached.

Setpoint Temperature Limits: Provides a restricted range of temperature control.

Freeze Guard: If the unit detects an ambient temperature below 4 °C (40 °F), the fan motor and electric heating strip start up and heat the room up to 10 °C (50 °F). The fan stops shortly after the temperature has been reached.

KEYPAD CONFIGURATION

Allows you to further configure the system to suit your application. Changes do not take effect until the unit is power-cycled.

To access configuration: Power up the unit. Press and hold the FAN SPEED and COOLER buttons for 5 seconds continuously, within 30 seconds of powering up the unit. If the appliance has been powered up for more than 30 consecutive seconds, it will be impossible to enter keypad configuration mode. When the keypad configuration mode is activated for the first time, the Fahrenheit/Celsius display mode is activated by default.

To scroll through configuration options: Press and release the FAN SPEED button. The stored value is displayed.

To change configuration settings: Press and release the WARMER or COOLER buttons.

To exit configuration: Keypad configuration terminates by itself 30 seconds after the last button press or when the keypad MODE button is pressed.

FAHRENHEIT/CELSIUS DISPLAY CHANGEOVER

Switches between Fahrenheit and Celsius degrees on the display. An "F" indicates degrees Fahrenheit and a "C" degrees Celsius. The default value is "F".

INDOOR AIR TEMPERATURE SENSOR BIASING FOR COOLING MODE

Sometimes called an anticipator, air temperature sensor offset is used to adjust the ambient air temperature reading in *Cooling* mode. This is not normally necessary.

INDOOR AIR TEMPERATURE SENSOR BIASING FOR DRYING MODE

Sometimes called an anticipator, air temperature sensor offset is used to adjust the ambient air temperature reading in *Drying* mode. This is not normally necessary.

INDOOR AIR TEMPERATURE SENSOR BIASING FOR HEATING MODE

Sometimes called an anticipator, air temperature sensor offset is used to adjust the ambient air temperature reading in *Heating* mode. This is not normally necessary.

INDOOR TEMPERATURE DISPLAY

Select between setpoint display only (SP) or room temperature display (AA). The default setting is "SP".

If "SP" is set, only the setpoint will be displayed in *Heating* and *Cooling* mode, regardless of the actual room temperature.

If "AA" mode is set, the room temperature is displayed in *Heating*, *Cooling* and *Fan* modes.

- If the mode is changed to *Heating* or *Cooling*, the setpoint will be displayed for 10 seconds. After these 10 seconds, the room temperature is displayed again.
- If the power button is pressed (when the unit is off) and the last mode was *Cooling* or *Heating*, the setpoint will be displayed for 10 seconds before the room temperature is displayed.
- In both *Heating* and *Cooling* modes, if the setpoint increase or decrease button is pressed, the display shows the setpoint up to 10 seconds after the last press of either button.

SWITCHING BETWEEN EMERGENCY AUTO COOLING ALLOWED AND EMERGENCY AUTO COOLING REJECTED

Press the WARMER or COOLER button to switch from automatic emergency cooling allowed to automatic emergency cooling rejected.

- Emergency Auto Cooling Allowed : the diode displays "CA".
- Emergency Auto Cooling Rejected : the diode displays "Cd".

Room temperature will be displayed again.

AUXILIARY CONTROLLER

WALL THERMOSTAT TERMINAL

Important : Only trained and qualified personnel should have access to the electrical panel of the unit's electrical accessories. Please contact your local electrician, dealer or distributor for assistance.

Thermostat Wire Routing : Thermostat wire is supplied on site. Recommended gauge is 18 to 20 gauge solid thermostat wire.

NOTE : It is recommended to run extra cables to the unit in case one is damaged during installation. The thermostat wire should always be routed around or under the wall sleeve, NEVER through it. The wire should then be routed behind the front panel to the easily accessible connector.

FIGURE 18

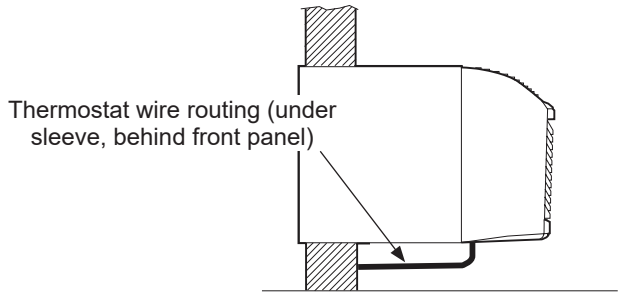
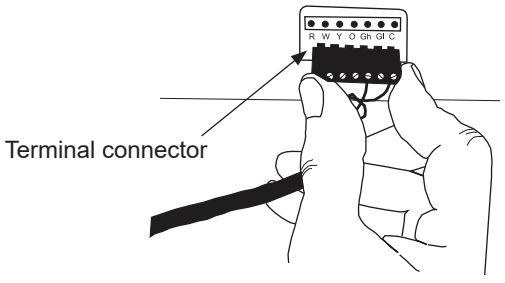


FIGURE 19



SYSTEM CONFIGURATION

Wiring Thermostat To Unit: Wire the wall thermostat input as shown in Figure 21.

NOTES:

- Terminal connector can be removed and replaced to simplify the wiring.
- For heat pump models, anytime there is a second-stage call for heating from the wall thermostat, the unit will automatically switch over to electric heating.

Installation:

1. Check that the power supply to the unit is disconnected.

2. Pull out the connector.

3. Connect the thermostat wires to the connector terminals on the unit.

4. Reinstall the terminal connector.

5. Ensure that the unit is configured for use with a wall-mounted thermostat.

6. Replace the control panel label with the wall thermostat label (included).

7. Restore power to the unit.

NOTES:

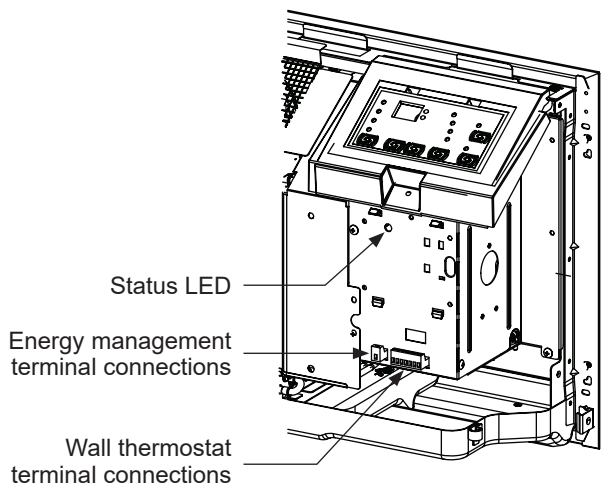
- Refer to thermostat installation instructions for details on wall thermostat installation.
- For thermostats with only one fan speed output (on or auto), the fan speed is determined by how the connector is wired. If a low fan is desired, wire the thermostat's G output to GL on the unit's terminal block. If a high fan speed is required, wire thermostat output G to GH on the device terminal block.
- After proper installation, if your thermostat is not working properly, refer to the Troubleshooting section.

TERMINAL CONNECTIONS

The wall thermostat terminal block is located behind the front panel and is easily accessible from the front of the control panel.

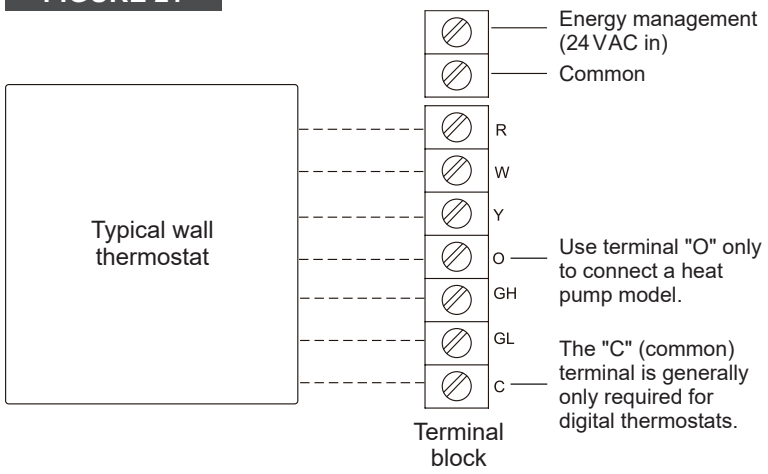
CAUTION: Improper wiring may damage electronic components. Common busing is not permitted. Damage or erratic operation may result. Failure to observe this warning may result in equipment damage or incorrect operation.

FIGURE 20



SYSTEM CONFIGURATION

FIGURE 21



Terminal	Designation
R	24 VAC
W	Electric heating
Y	Compressor
O	Reversing valve
GH	High fan
GL	Low fan
C	Common

NOTE: Any illegal input combination will be considered a thermostat wiring fault and will illuminate the status LED on the main board (see "Intelligent self-diagnosis" section).

NOTES:

- It is recommended to use an original brand compatible thermostat.
- If another brand of thermostat is equipped, make sure that the "O" signal gives a switch-on command in *Cooling* mode and a switch-off command in *Heating* mode. Please contact our technical support staff.

ENERGY MANAGEMENT INPUT (FRONT DESK CONTROL)

The controller can handle a switch signal from a remote energy management input, called EMsignal or "Front Desk Control". The input must be 24 VAC. If the system receives a 24 VAC signal, it will switch the unit off; otherwise, the unit will operate under normal control. This function is deactivated for freeze guard. See Figure 20 and Figure 21 for terminal connections.

INTELLIGENT SELF-DIAGNOSIS

This appliance is equipped with a computer board which constantly checks the main components of the equipment to ensure that they are operating correctly. In normal operation, the unit status LED ("STATUS", on the main circuit board) is continuously lit.

In the event of a major problem, the unit shuts down and displays a diagnostic code on the unit's display. If the fault is minor and the unit corrects the problem itself, the diagnostic code flashes on the status LED, which is easily visible when the front panel is removed (see Figure 20). Fault status codes can be found in the Troubleshooting section.

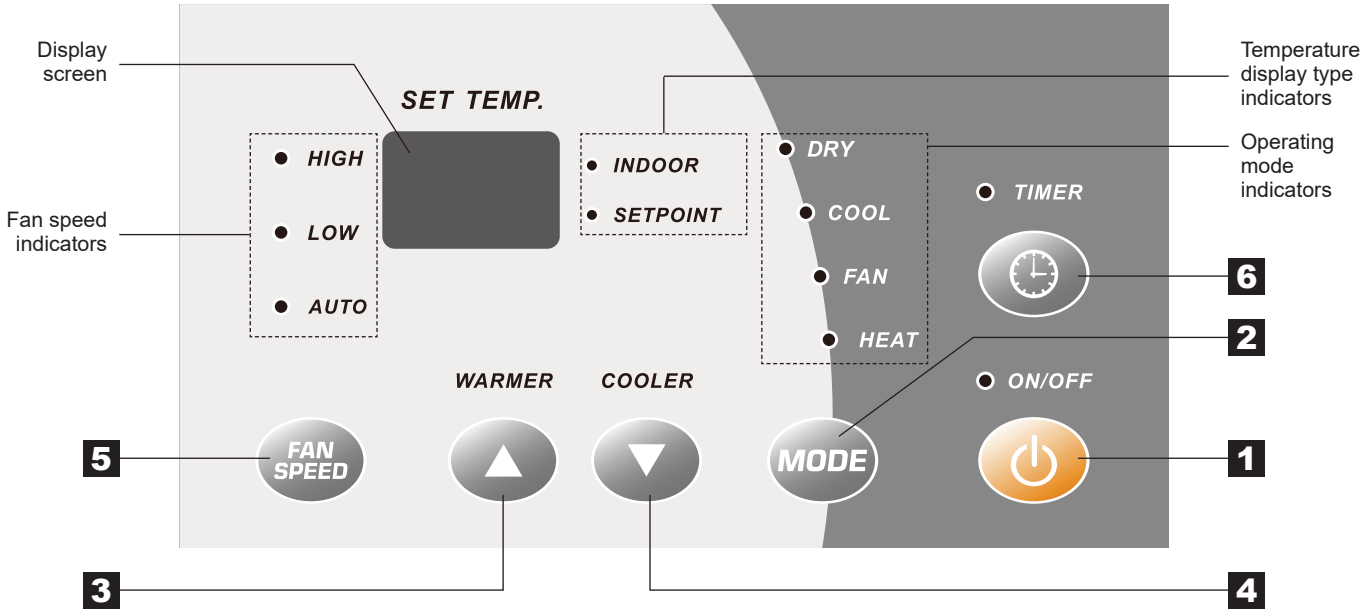
OPERATION

CONTROL PANEL OPERATION

When a button is pressed, the corresponding function is started after 2 seconds. The display is started immediately.

Pressing the WARMER or COOLER button while the unit is off will cause the double 8 nixie tube to display the indoor temperature for 15 seconds, then switch off. Pressing the MODE button while the unit is off will return the controller to the operating mode prior to power-down.

Green LEDs indicate operation.



1 ON/OFF Button

Turns the unit on or off.

2 MODE Button

Toggles between *Cooling*, *Fan*, *Heating* and *Drying* modes. The corresponding LED lights up.

3 WARMER Button

Increases temperature or timer setting.

4 COOLER Button

Decreases temperature or timer setting.

5 FAN SPEED Button

Toggles between *High*, *Medium*, *Low* or *Auto* fan speed settings. The corresponding LED lights up.

6 TIMER Button

Allows you to set a timer (more details on next page).

OPERATION

TIMER FUNCTION

- **Switch-on timer:** When the unit is off, a switch-on timer can be set. The setting range is between 0.5 and 24 hours. When the timer activation time is reached, the system operates according to the set mode.
- **Switch-off timer:** When the unit is running, a switch-off timer can be set. The setting range is 0.5~24h. When the timer stop time is reached, the system stops operating.
- **Timer setting:** Press the TIMER button to set the timer function. The double 8 nixie tube displays the selected time, which can be set by pressing the WARMER or COOLER buttons. The timer setting range is 0.5 to 24 hours. Five seconds after setting the timer, the timer function is activated and the TIMER indicator lights up. If "--" is displayed, the system aborts the timer setting.
- **Timer preview:** When a timer has been set, press the TIMER button to preview the remaining duration of the timer.

NOTE: If a timer has been set, powering the unit on or off or losing power will cancel the timer setting.

OTHER FUNCTIONS

Buzzer (optional): When the controller is powered up or a valid remote control or button signal is received, the buzzer emits a beep.

Emergency cooling operation: If emergency cooling is enabled, the unit starts cooling automatically when the indoor ambient temperature is ≥ 30 °C (86 °F). When the indoor ambient temperature reaches 27 °C (81 °F), the unit switches off.

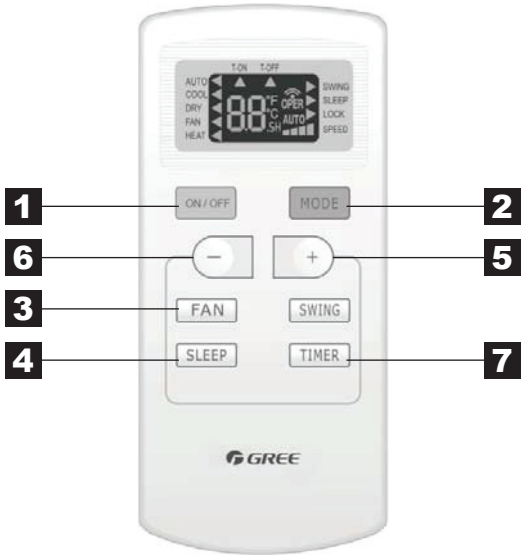
F code remote control: Optional

OPERATION

REMOTE CONTROL OPERATION

The remote control is an optional accessory for some models.

NOTE: Make sure there are no obstructions between the receiver and the remote control; do not drop or throw the remote control; do not allow liquids to enter the remote control and do not place the remote control in direct sunlight or in a very hot place.



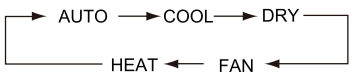
1 ON / OFF Button

Press this button to switch the unit on, press it again to switch it off.

▪ When switching the unit on or off, the timer and sleep functions are cancelled, but the set time is preserved.

2 MODE Button

Pressing this button allows circular selection of *Automatic*, *Cooling*, *Drying*, *Fan* and *Heating* modes.



▪ In *Heating* mode, the initial temperature value is 28 °C (82 °F). In other modes, the initial value is 25 °C (77 °F).

3 FAN Button

Pressing this button allows circular selection of *Auto*, *Low*, *Medium*, *High* and *Very High* speeds.

3 FAN Button (continuation)

▪ When the appliance is switched on for the first time, the default speed setting is *Auto*.

▪ In *Drying* mode, only *Low* speed can be set. Pressing this button will not change the fan speed.

4 SLEEP Button

Pressing this button activates or deactivates the *Sleep* function.

▪ When the appliance is switched on for the first time, the *Sleep* function is activated by default.

▪ After activation of the Sleep function, the corresponding LED lights up.

▪ In this mode, it is possible to set a timer.

▪ This function is not available in *Fan* and *Auto* modes.

5 + / – Buttons

Press either of these buttons while the unit is running to increase or decrease the setpoint temperature. Holding the button down for more than 2 seconds will allow you to speed through the temperature values. Release the button when you've reached the desired value.

▪ In *Auto* mode, it is not possible to set the temperature using these buttons.

▪ The temperature setting range is 16 to 30 °C (61 to 86 °F).

6 TIMER Button

Press this button when the unit is turned off to set a switch-on timer. The "T-ON" and "H" symbols will start flashing on the remote control display. While they are blinking, use the " + " and " – " buttons to set the desired time.

6 TIMER Button (continuation)

The time will increase or decrease by 0.5 hours with each press of these buttons. Holding either button for a prolonged period (over 2 seconds) will allow you to speed through the time values. Release the button when you've reached the desired value. Press the TIMER button again to complete the setting. If the setting is valid, the set time will be displayed for 2 seconds before returning to the temperature display.

- You can view the remaining timer duration by pressing this button again.
- Two quick presses of this button cancels the set switch-on timer.

Press this button when the unit is turned on to set a switch-off timer. The setting method is the same as for a switch-on timer.

SPECIAL FUNCTIONS

CONTROL LOCK

Press the " + " and " – " buttons simultaneously to lock or unlock the keypad. When the keypad is locked, the display shows the "LOCK" symbol. This symbol blinks three times when any key is pressed, to indicate the locked status of the controls. When the keypad is unlocked, the "LOCK" symbol disappears from the display. When the unit is switched on for the first time, the keypad is unlocked by default.

FAHRENHEIT AND CELSIUS

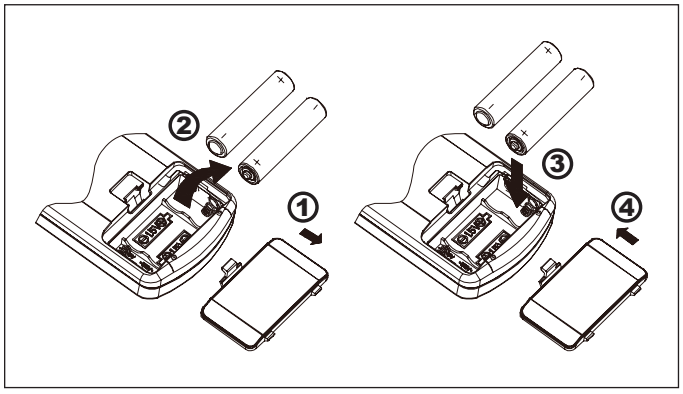
When the unit is off, hold down the " – " and MODE buttons simultaneously to switch between Celsius and Fahrenheit temperatures.

CONTINUED FAN HEATING

When the unit is in *Heating* mode and is switched off, the compressor and outdoor fan stop running and the upper and lower guide boards rotate to the horizontal position, but the indoor fan continues to run at low speed for a certain period of time to maintain heating. Ten seconds later, the unit stops completely.

BATTERY REPLACEMENT

1. Press slightly on the tab of the battery cover on the back of the remote control to remove it.
2. Remove used batteries.
3. Insert two new AAA 1.5 V dry batteries, observing correct polarity.
4. Replace the battery cover.



NOTES:

- When changing batteries, do not use used or non-compliant batteries, otherwise you may cause the remote control to malfunction.
- If the remote control is not to be used for long periods, please remove the batteries, as they could leak and damage the remote control.
- The remote control must be used within the unit's reception range.
- The remote control must be kept 1 meter away from any TV or stereo audio equipment.
- If the remote control does not operate normally, remove the batteries, then reinsert them after 30 seconds. If it still doesn't work, change them for new ones.

CARE AND CLEANING

FRONT PANEL AND CASE

- Turn off the unit and disconnect the power supply.
- For cleaning, use water and a mild detergent. Do NOT use bleach or abrasive cleaners. Some commercial cleaners may damage plastic parts.

OUTDOOR COIL

The outdoor coil should be checked regularly. The unit should be disassembled to inspect any dirt accumulating inside the coil. If the coil is clogged with dirt or soot, it must be professionally cleaned.

NOTE: Never use high-pressure sprays on the coil.

CAUTION: Restricting air flow may damage the unit. Failure to observe this warning may result in equipment damage or malfunction.

BASEPAN

In some installations, dirt or other debris may be blown from the outside to the inside of the unit and settle in the base pan (bottom part of the unit).

In some parts of North America, a jelly-like substance may be observed in the base pan. Check the pan periodically and clean it if necessary.

AIR FILTERS

Important: Turn off the unit before cleaning the air filters.

The most important thing to do to maintain the efficiency of the unit is to clean the filters at least every 30 days (or sooner, depending on the application). Clogged filters reduce the efficiency of cooling, heating and air flow.

To clean the air filters:

- Vacuum to remove heavy soil.
- Run the filters through with water.
- Let them dry thoroughly before putting them back in place.

FIGURE 23

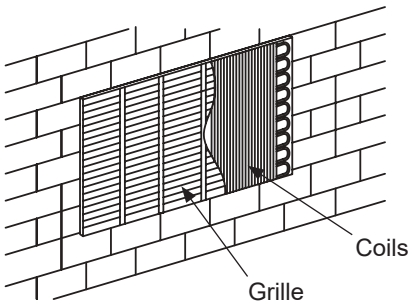
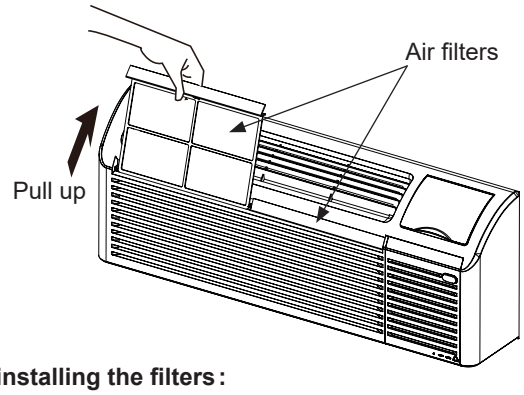
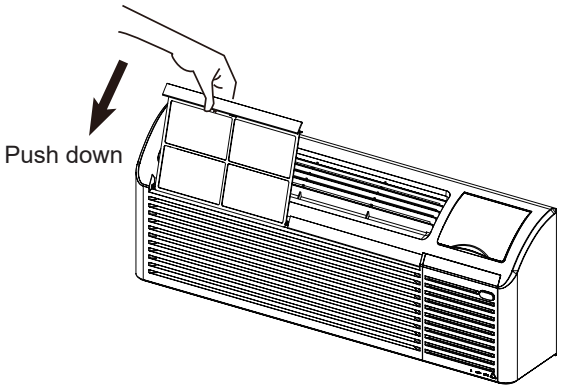


FIGURE 24

Removing the filters:



Reinstalling the filters:



CAUTION: Do not operate the unit without the filters in place. If a filter is torn or damaged, it must be replaced immediately. If the unit is operated without filters or with damaged filters, dirt and dust will reach the inner coil and reduce the unit's cooling, heating, airflow and efficiency performance. Restricting air flow may damage the unit. Failure to do so may result in damage or malfunction of the unit.

PREVENTIVE MAINTENANCE

Preventive maintenance is essential to the proper operation, efficiency and longevity of your equipment.

To ensure proper operation, the equipment must be properly maintained. Inspection and testing of equipment operation should be carried out several times a year. When carrying out regular inspection and maintenance, follow the guidelines below:

- Clean both sides of the outdoor coil (never use high-pressure spray on coils).
- Clean the base pan and filter of the outdoor vent.
- Clean the outdoor orifice and fan.
- Clean indoor coil (never use high-pressure spray on coils).
- Clean the indoor fan, metal grille and front panel.
- Clean or install a new filter at the indoor air inlet.
- Clean the wall sleeve and outdoor grille.
- Inspect power cord and plug.
- Check electrical connections.
- Make sure the front panel is correctly mounted and undamaged.
- Make sure the wall sleeve is correctly installed.
- Make sure the heating and cooling cycles are working correctly.

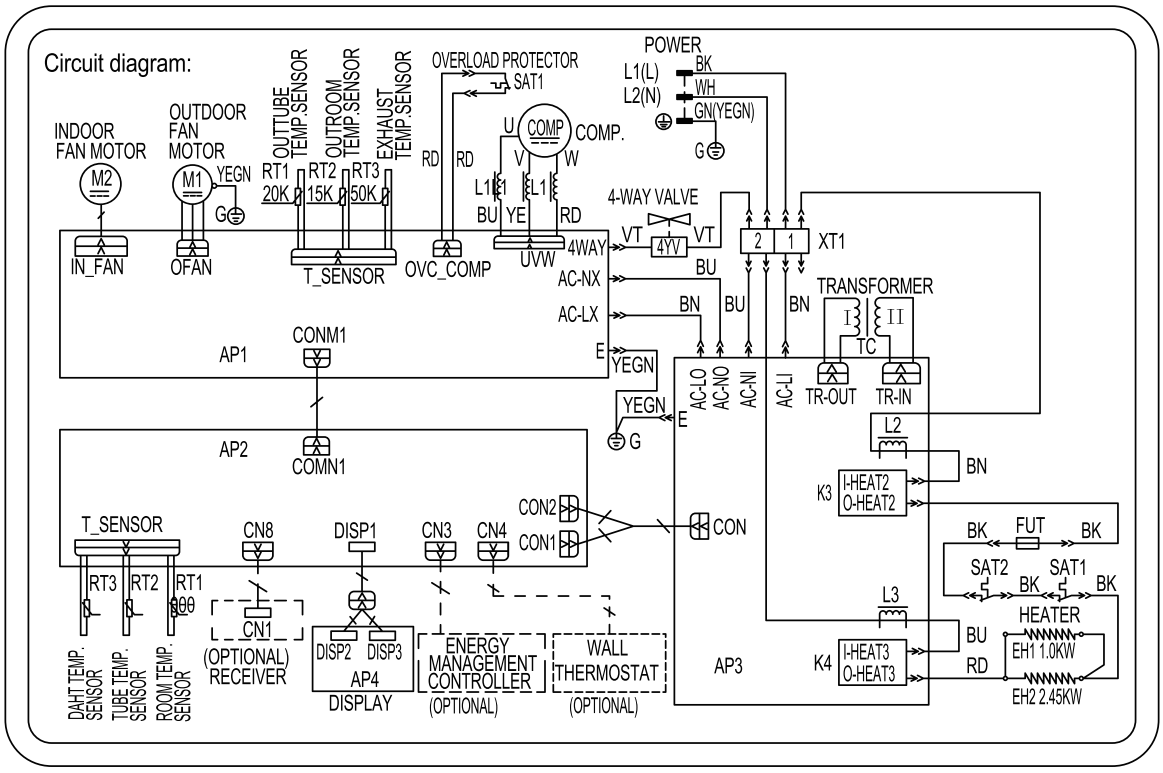
PROFESSIONAL QUALIFICATION

The qualification of personnel performing maintenance, servicing and repair work must comply with Appendix HH of UL 60335-2-40, CAN/CSA-C22.2 No. 60335-2-40-19. All work procedures affecting safety equipment must be carried out only by competent individuals in accordance with Appendix HH. Special training in addition to the usual refrigeration repair procedures is required when equipment containing FLAMMABLE REFRIGERANTS is involved.

ELECTRICAL DIAGRAM

Electrical diagrams are subject to change without notice. Please refer to the one on the unit.

GAA09AF-D6DRNB5A / GAA12AF-D6DRNB5A / GAA15AF-D6DRNB5A



TROUBLESHOOTING

COMMON ISSUES

If your appliance appears defective, please check the possible explanations for your situation in the table below, it may be that a simple solution can help solve the problem. If the problem persists, please call our Service Center at **1 800 686-2175** for assistance.

SITUATION	POSSIBLE CAUSES	SOLUTIONS
The appliance does not start.	The appliance may have been unplugged.	Check that the plug is securely inserted in the wall socket. Note: The plug has a test/reset button. Make sure it hasn't tripped.
	The fuse may have blown.	Check and replace fuse.
	The circuit breaker may have been tripped.	Check and reset circuit breaker.
	The unit may have been set to operate from a wall-mounted thermostat.	Check the section on DIP switch settings to ensure that they are correctly set.
	The unit may be in protection or diagnostic mode.	See the section on intelligent self-control.
The efficiency of the cooling or heating is very poor.	The air vents are obstructed.	Clear objects or furniture that could be blocking the vents of the unit.
	The temperature setting might be too low or not high enough.	Adjust the set temperature so that it is below or above the ambient temperature.
	The air filter may be dirty.	Clean or replace the air filter.
	The room may have been excessively hot or cold when the unit was started.	Allow sufficient time for the appliance to heat or cool the room. Start heating or cooling early, before the outside temperature, the heat of the kitchen or crowds of people make the room uncomfortable.
	The vent door may have been left open.	Close the vent door.
	The unit may be in protection or diagnostic mode.	See the section on intelligent self-control.
	The compressor may be in protection delay.	A protection delay of approximately 3 minutes applies when the compressor is started after a power failure, or restarted immediately after it has been stopped, to prevent the compressor from being overloaded. Wait approximately 3 minutes for the compressor to start.
The display shows strange numbers or characters.	The unit may be in protection or diagnostic mode.	See the section on intelligent self-control.
	The unit may be set for °C instead of °F.	See the section on keypad configuration.
The unit is making noises.	The noises may be normal.	Clicking, gurgling and hissing noises are normal during operation.
There is water dripping from the unit outside.	The weather may be very hot and humid.	If a drain kit has not been installed, it is normal for condensation to run off in very hot, humid weather.
	The drain kit may be leaking due to improper installation.	If a drain kit has been installed and connected to a drain system, check the seals and fittings around the drain for leaks.

TROUBLESHOOTING

There is water dripping from the unit inside.	The wall sleeve may not be installed level.	The wall sleeve must be installed level to allow condensation to drain properly. Check that the installation is level and make any necessary adjustments.
Ice or frost forms on the indoor coil.	The outside temperature may be very low.	When the outside temperature is around 12.7 °C (55 °F) or less, frost may form on the indoor coil when the unit is in *Cooling* mode. Switch the unit to *Fan* mode until the ice or frost melts.
	The air filter may be dirty.	Clean or replace the air filter.
The compressor is protection delay.	The power may have been cut off and the compressor is in restart protection.	To prevent compressor short-circuits, there is a 3-minute start-up delay and a minimum operating time of 3 minutes. Each time the unit is plugged in or the power is re-stored, a random restart of the compressor occurs. After a power failure, the compressor restarts after about 3 minutes.

NOTES:

- If the circuit-breaker trips or the fuse blows repeatedly, call in a qualified electrician.
- If the unit is installed in a location where condensation water could flow into an undesirable area, a drain kit must be installed and connected to the drain system.

MALFUNCTION CODES

If any of the following malfunction codes appear on the display screen of the unit, please call Customer Service at **1 800 686-2175** for assistance.

CODE	DESCRIPTION
F1	Indoor ambient temperature sensor open or short-circuited.
F2	Indoor tube temperature sensor open or short-circuited.
F3	Outdoor ambient temperature sensor open or short-circuited.
F4	Outdoor tube temperature sensor open or short-circuited.
FJ	Air outlet temperature sensor malfunction.
FP	Low temperature protection.
-	Incorrect wire connection indication for wired controller.
-	Evaporator protection against high temperatures.
-	Outdoor condenser protection against high temperatures.
-	Evaporator protection against freeze.
-	Frost prevention (heat pump).
F0	Freon low-level protection.
H3	Overload detection protection.
E5	Compressor overcurrent protection.
A2	Malfunction protection for compressor electric heater relay.
U5	Unbalanced electrical current detected between null line and live line.
A0	Incorrect electrical heating combination.
A4	Abnormal electrical heating current.
C7	Temperature limiter protection time too long.

SPECIAL SAFETY PRECAUTIONS FOR FLAMMABLE REFRIGERANTS

Aptitude requirement for service technician (repairs should be done only be specialists).

a. Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority,which authorises their co-mpetence to handle refrigerants safely in acco-rdance with an industry recognised assessment specification.

b. Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.

SAFETY PREPARATION

The maximum refrigerant charge quantity is shown in the following table.

		Maximum Charge (kg)													
	Charge Quantity (kg)	≤ 0.921	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5
Minimum Surface Area (m^2)	Floor Location	/	14.5	16.8	19.3	22.0	24.8	27.8	31.0	34.3	37.8	41.5	45.4	49.4	53.6
	Window Mounted	/	5.2	6.1	7.0	7.9	8.9	10.0	11.2	12.4	13.6	15.0	16.3	17.8	19.3
	Wall Mounted	/	1.6	1.9	2.1	2.4	2.8	3.1	3.4	3.8	4.2	4.6	5.0	5.5	6.0
	Ceiling Mounted	/	1.1	1.3	1.4	1.6	1.8	2.1	2.3	2.6	2.8	3.1	3.4	3.7	4.0

Note: Please refer to the nameplate for the quantity of R32 to be charged.

SITE INSPECTIONS

- Prior to beginning work on systems containing flammable refrigerant, safety inspections are required to ensure that the risk of ignition is minimized.
- For repair to the refrigerant system, the following precautions must be observed before performing any work on the system.***WORK PROCEDURE***
- Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

GENERAL WORK AREA

- All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.
- The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

CHECKING FOR THE PRESENCE OF REFRIGERANT

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

PRESENCE OF FIRE EXTINGUISHER

- If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand.
- Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

NO IGNITION SOURCES

- No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that contains or has contained flammable refrigerant 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 flammable 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.

VENTILATED AREA

- Ensure that the area is in the 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.

INSPECTIONS OF REFRIGERATION EQUIPMENT

- 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 charge size 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;
– Refrigeration 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.

CHECKS TO ELECTRICAL DEVICES

- 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 there no live electrical components and wiring are exposed while charging, recovering or purging the system;
  – That there is continuity of earth bonding.

REPAIRS TO SEALED COMPONENTS

- 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 absolutely necessary to have an electrical supply to equipment during servicing, then a permanently 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 apparatus is mounted securely.
- Ensure that seals or sealing materials have not degraded such 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.

Note: The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

REPAIR TO INTRINSICALLY SAFE COMPONENTS

- 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.

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 take into account the effects of aging or continual vibration from sources such as compressors or fans.

DETECTION OF FLAMMABLE REFRIGERANTS

- Under no circumstances shall potential 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.

LEAK DETECTION METHODS

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants:

– Electronic leak detectors shall be used to detect flammable refrigerants, but 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 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 pipe-work.

– 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.

– Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

REMOVAL AND EVACUATION

- 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 the best practice is followed since flammability is a consideration. Opening of the refrigeration systems shall not be done by brazing.
- The following procedure shall be adhered to:
  – Remove refrigerant;
  – Purge the circuit with inert gas;
  – Evacuate;
  – Purge again with inert gas;
  – Open the circuit by cutting or brazing.
- The refrigerant charge shall be recovered into the correct recovery cylinders.
- The system shall be “flushed” with OFN to render the unit safe.
- This process may need to be repeated several times.
- Compressed air or oxygen shall not be used for this task.
- Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum.
- This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.
- This operation is absolutely vital if brazing operations on the pipe-work are to take place.
- Ensure that the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available.

CHARGING PROCEDURES

- 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 minimise the amount of refrigerant contained in them.
  – Cylinders shall be kept upright.
  – Ensure that the refrigeration 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 refrigeration system.
- Prior to recharging the system it shall be pressure tested with OFN.
- 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

- Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail.
- 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 reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.
  a) Become familiar with the equipment and its operation.
  b) Isolate 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 supervised at all times by a competent person;

– Recovery equipment and cylinders conform to the appropriate standards.

d) Pump down 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 manufacturer's 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 refrigeration system unless it has been cleaned and checked.

LABELLING

- Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant.
- The label shall be dated and signed.
- Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

REFRIGERANT RECOVERY

- 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 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.