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LG

# LG Room Air Conditioner ***SERVICE MANUAL***

## CAUTION

- BEFORE SERVICING THE UNIT, READ THE SAFETY PRECAUTIONS IN THIS MANUAL.
- ONLY FOR AUTHORIZED SERVICE PERSONNEL.

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## 1. PREFACE

This SERVICE MANUAL provides various service information, including the mechanical and electrical parts etc. This room air conditioner was manufactured and assembled under a strict quality control system. The refrigerant is charged at the factory. Be sure to read the safety precautions prior to servicing the unit.

### 1.1 SAFETY PRECAUTIONS

1. When servicing the unit, set the ROTARY SWITCH or POWER SWITCH to OFF(O) and unplug the power cord.
2. Observe the original lead dress.  
If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
3. After servicing the unit, make an insulation resistance test to protect the customer from being exposed to shock hazards.

### 1.2 INSULATION RESISTANCE TEST

1. Unplug the power cord and connect a jumper between 2 pins (black and white).
2. The grounding conductor (green or green & yellow) is to be open.
3. Measure the resistance value with an ohm meter between the jumpered lead and each exposed metallic part on the equipment at all the positions (except OFF or O) of the ROTARY SWITCH.
4. The value should be over 2MΩ.

# 1.1 SPECIFICATIONS

## Cooling / Electric Heater

Model Name	Cooling(Btu/h)	Cooling Watts(W)	EER	Electric Heat (Btu/h)	Electric Heat Amps(A)	Min Circuit Protection (Amps)
<b>LP120CEM</b>	<b>11800/11500</b>	1055/1025	11.2/11.2	-	-	20

## Cooling / Heat Pump / Electric

Model Name	Cooling(Btu/h)	Cooling Watts(W)	EER	Electric Cycle Heat (Btu/h)	COP	Electric Heat (Btu/h)	Electric Heat Amps(A)	Min Circuit Protection (Amps)
<b>LP090HEM</b>	<b>9300/9000</b>	800/775	11.6/11.6	8200/8000	3.4/3.4	11900/9900	3.2/3.5	20
<b>LP120HEM</b>	<b>12100/11800</b>	1090/1065	11.1/11.1	10900/10700	3.3/3.3	11900/9900	4.4/4.8	20

### LP 12 0 C M 2

12 34 5 6 7 8

Digits 1,2 - LG Packaged Terminal Air Conditioner

Digits 3,4 - Unit Cooling Capacity

07 = 7,000 Btu/h

09 = 9,000 Btu/h

12 = 12,000 Btu/h

15 = 15,000 Btu/h

Digit 5 - Serial No.

Digit 6 - Product Type

C = Air Conditioner

H = Heat Pump

Digit 7- Control Type

M = Mechanical Control

Digit 8 - Electric Heating Capacity

2 = 2.0 kW

3 = 3.5 kW

5 = 5.0 kW

## 1.2 features

### Unit Features

The PTAC has many features, some of which are different than those found on conventional PTAC units. The servicer must be familiar with these features in order to

properly service the unit.

- **Highly featured Micom controls using IIR** (infinite impulse response)

IIR function can make Micom controls maximize and keep the comfort conditions to sense the small changes in temperature per second.

- **Compressor Restart delay**

This feature extends the overall life of compressor by preventing the short-cycling of the air-conditioner. When the compressor restarts, LG PTAC is designed to give a minimum of three minutes to have a time of equalizing the refrigerant pressures for optimizing cycling.

- **Fan-Only Setting - High/Low**

The unit provides the function of selecting the either High or Low speed for Fan-Only operation.

- **Indoor Fan Speed Selections - High/Low**

The unit is operated in High-Heat or Low-Heat or High Cool or Low Cool.

- **Two Fan motors**

The unit has two fan motors to provide the occupants with the quiet environment to enjoy the peaceful life and maximum operating efficiency.

- **LED Diagnostics**

All units have this feature indicating the problem when the unit is not operating properly with easy -to-read diagnostics. For example, 1 blink every 2 seconds indicates the compressor failure.

- **Indoor Filters**

The unit uses the two indoor filters easily slide in and out. The filters may be cleaned by washing and brushing without removing the front grille.

- **Rotary Compressor**

The unit uses the rotary compressor for the quiet, reliable operation and prolong life.

- **2 Position Discharge Grille**

The discharge grille can provide air flows upward at an angle of 40 off vertical or 80 15 degree off vertical. An angle is changed by removing the front grille and 4screws that fasten the discharge grille to the front grille to rotate an alternate position of the louvers.

- **Indoor Room Freeze Protection**

When the unit senses the room temperature falls to 40°F below, the unit activates the fan motor and either the electric resistance heater or the hydronic heater to prevent pipes or fixtures from freezing. This also overrides front desk control of the unit mounted or wall mounted controls.

- **Door Switch/Occupancy Sensor**

The unit is capable of accommodating a field installed door switch and occupancy sensor to operate the energy management feature. For additional information, refer to the Unit Operation section.

- **Compressor Overload Protection**

This feature prevents the damage of the compressor by sensing the indoor tube temperature in heating. If the indoor temperature is over 130°F, the outdoor fan will be switched off and on below 120°F.

- **Outdoor Air Temperature Switchover**

The unit is designed to control the electric heater interfacing with the outdoor temperature. When the outdoor temperature falls to 20°F below, it makes the compressor be off and the electric heater be turned on until the outdoor temperature is above 25°F. This will effectively change the Unit from heat pump mode to total electric resistance heat.

- **Temperature limits**

The unit is programmed to provide both heating and cooling temperature limits by dip switches on control panel from 50°F to 90°F. Temperature limits help to prevent overheating and overcooling for reducing the energy costs.

- **Condensate Drain Valve**

The unit has the condensate drain valve that prevents water from freezing in basepan.

- **Quick Heater Recovery**

The unit is designed to operate the electric heater to warm the room to the temperature set point as soon as heat pump cycle is on in heating. This feature has an advantage of reducing the time to reach the set point and improving the temperature increase for better comfort.

- **Reverse Cycle Defrosting - (PTHDs only)**

The unit will activate the reverse cycle defrost When the outdoor coil temperature has remained at a cold temperature to form the ice on the coil. This ice will reduce airflow though the coil and will also reduce the efficiency of unit. The LG PTHP will employ an active reverse cycle defrost function to melt the ice off the outdoor coil for insuring room comfort conditions and savings from extended operation.

- **High Temperature Heat Pump Operation Protection**

The compressor will be switched off to prevent damage when the heat pump is operated in high outdoor temperatures.

- **Remote Thermostat Control**

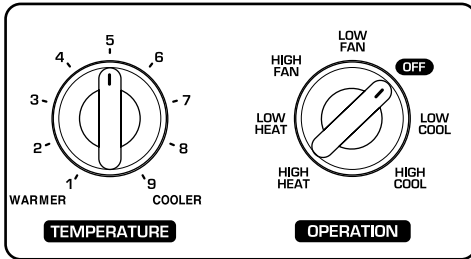
Each unit is built to be operated from any standard 4 or 5 wire remote-mounted thermostat, if desired. The unit has a built-in low voltage power source which can accommodate a large variety of thermostat choices-manual, auto changeover or programmable. A remote thermostat can also be added to any installed unit.

- **Zone Sensor**

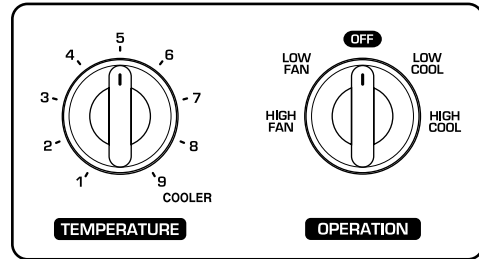
Occupants enjoy ultimate comfort with consistent climate control. Attach an optional, inexpensive remote Zone Sensor, to exactly match the functions of the PTAC without disabling any features.

# 1.3 CONTROL LOCATIONS

## • OPERATION



**ELECTRIC HEATING MODEL**



**COOLING ONLY MODEL**

### TEMPERATURE CONTROL

Set the Thermostat control to the desired temperature mark 5 (the mid-point is a good starting position). If the room temperature is not satisfactory after a reasonable time, adjust the control to a cooler or warmer setting, as appropriate.

### • VENTILATION

The ventilation lever is located to the lower left side of the unit. The ventilation lever must be in the CLOSE position in order to maintain the best cooling conditions.

When fresh air is necessary in the room, set the ventilation lever to the OPEN position.

The damper is opened and outdoor air is drawn into the room. This will reduce the cooling or heating efficiency.

### OPERATION MODE SELECTOR

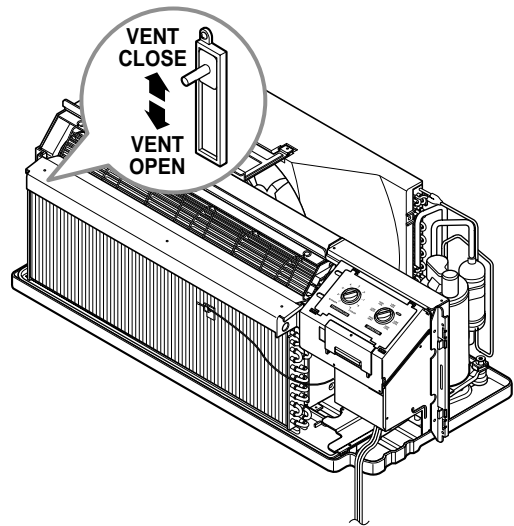
- OFF: Turns air conditioner off.
- LOW FAN: Low speed fan operation without cooling.
- HIGH FAN: High speed fan operation without cooling.
- LOW COOL: Cooling with the low speed fan operation.
- HIGH COOL: Cooling with the high speed fan operation.
- LOW HEAT: Heating with the low speed fan operation.
- HIGH HEAT: Heating with the high speed fan operation.

### CAUTION

When the air conditioner has performed a cooling or heating operation and is turned off or set to the fan position, wait at least 3 minutes before resetting to the cooling operation.

### NOTE

A slight heat odor may come from the unit when first switching to HEAT after the cooling season is over. This odor, caused by fine dust particles on the heater, will disappear quickly. This is harmless.



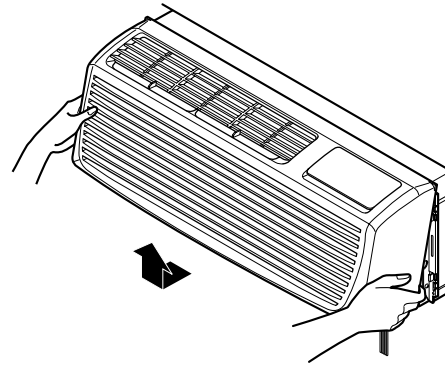
## 1.4 ADDITIONAL CONTROLS

### • REMOVING THE FRONT GRILLE

Additional controls are available after removing the front grille and option cover of control box.

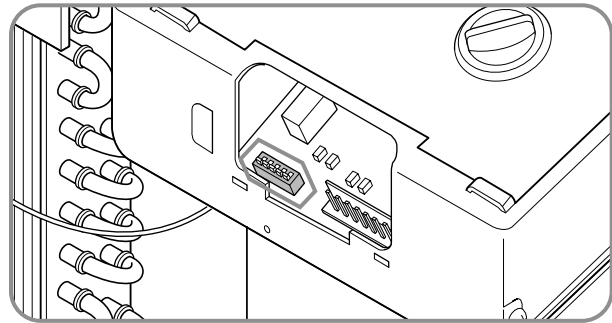
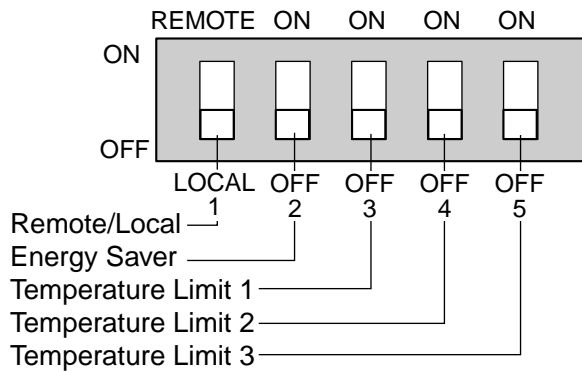
To remove the front grille, pull out the bottom of front grille and then lift up.

To replace the front grille, place the tabs over the top of the unit and push the bottom of front grille until the clips snap into place.



### • ADDITIONAL CONTROLS

The additional controls are located behind the option cover of control box. The standard settings will be in the OFF position. The authorized service man has to check switches and ensure the switches are in the desired position.



### • TEMPERATURE LIMITING

Temperature Limiting can save money by limiting the lowest temperature for cooling and the highest temperature for heating. The temperature limiting is controlled by dip switch #1 - #3.

This temperature limiting is not available with the Remote Wall Thermostat.

Temperature Limit #1	Temperature Limit #2	Temperature Limit #3	Cooling Operation		Heating Operation	
			Lowest Temp.	Highest Temp.	Lowest Temp.	Highest Temp.
OFF	OFF	OFF	54°F (12.2°C)	86°F (30.0°C)	54°F (12.2°C)	86°F (30.0°C)
ON	OFF	OFF	56°F (13.3°C)	86°F (30.0°C)	54°F (12.2°C)	84°F (28.9°C)
OFF	ON	OFF	58°F (14.4°C)	86°F (30.0°C)	54°F (12.2°C)	82°F (27.8°C)
ON	ON	OFF	60°F (15.5°C)	86°F (30.0°C)	54°F (12.2°C)	80°F (26.7°C)
OFF	OFF	ON	62°F (16.6°C)	86°F (30.0°C)	54°F (12.2°C)	78°F (25.5°C)
ON	OFF	ON	64°F (17.7°C)	86°F (30.0°C)	54°F (12.2°C)	76°F (24.4°C)
OFF	ON	ON	66°F (18.9°C)	86°F (30.0°C)	54°F (12.2°C)	74°F (23.3°C)
ON	ON	ON	68°F (20.0°C)	86°F (30.0°C)	54°F (12.2°C)	72°F (22.2°C)

• **REMOTE/LOCAL CONTROL**

When remote/local switch #1 is on, it allow the unit to operate by the control of Remote Wall Thermostat. The unit control by knobs are not available.

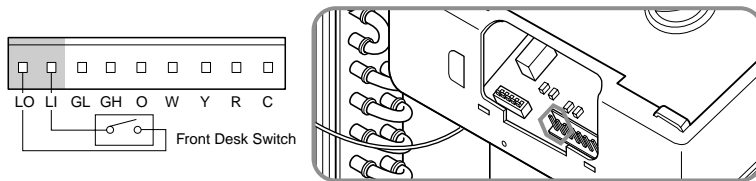
• **ENERGY SAVER**

The energy saver switch #2 is on. This switch is set at continuous fan to provide continuous fan operation in cool or heat modes. When the switch is off the continuous fan allows continuous circulation of room air and make the more balanced temperature of the room. When the switch is on the fan is on or off with the compressor or with the heater.

• **FRONT DESK CONTROL**

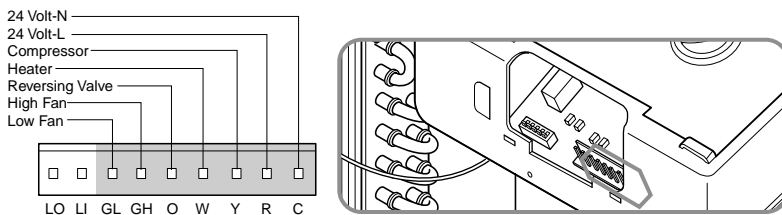
When the pair wire is connected to the connector LO and LI, the unit can be turned ON or OFF with a switch located at the Front Desk Control panel. When the front desk switch is ON, the fan operate according to the condition of setting without working compressor and heater. When the front desk switch is OFF, the unit can operate according to the setting of controls.

Wire # AWG	Maximum Length
#22	600ft(180m)
#20	900ft(270m)
#18	1500ft(450m)
#16	2000ft(610m)



• **REMOTE WALL THERMOSTAT**

When the wires are connected, the unit will be controlled by a remote wall thermostat. The thermostat connections supply the 24 Volt AC. When you install the digital / electronic thermostat, you must set it to the 24 Volt AC. See the installation Instruction in this manual for the Remote Wall Thermostat.



**Note:** The following figures show wiring schematics for heat pump and straight cool units with electric heat, respectively.

**Wiring Schematic for Remote Heat Pump**

**Wiring Schematic for Straight Cool Unit.**



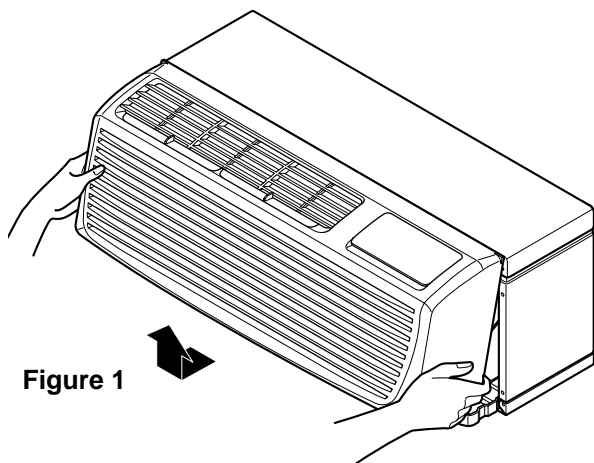
## 2. DISASSEMBLY INSTRUCTIONS

— Before the following disassembly, POWER SWITCH is set to OFF and disconnected the power cord.

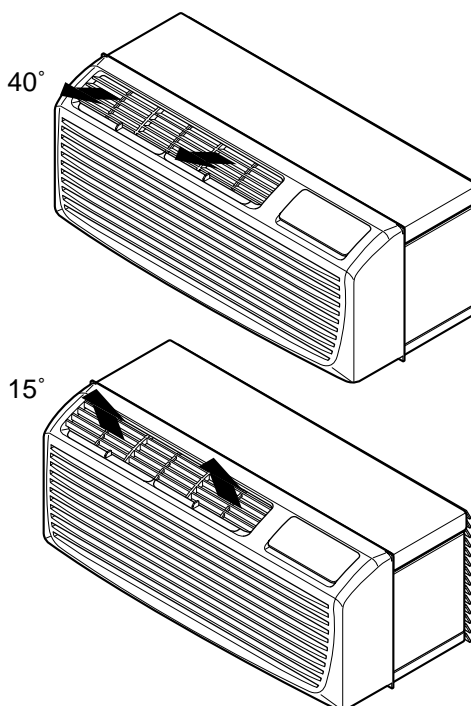
### 2.1 MECHANICAL PARTS

#### 2.1.1 FRONT GRILLE

1. Remove the front grille. (See Fig. 1)
2. To remove the front grille, pull out the bottom of the front grille and then lift up.  
Re-install the component by referring to the removal procedure.
3. To replace the front grille, place the tabs over the top of the unit and push the bottom of front grille until the clips snap into place.

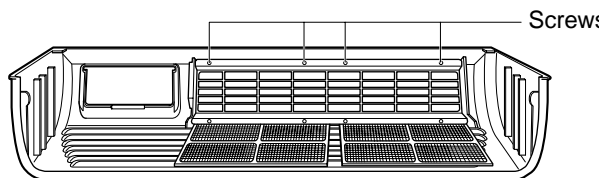


- This Room Air Conditioner (PTAC) discharges air from the top of the unit through reversible, 2-position discharge grille louvers. The unit is shipped from the factory with the discharge grille louvers at an angle of 40° off vertical. In an alternate position the louvers will be at an angle of 15° off vertical.



To adjust air direction, remove the front grille. Remove the 4 screws that fasten the discharge grille to the front grille.

Flip the discharge grille 180°, then reattach the discharge grille to the front grille with 4 screws.



### 2.1.2 CONTROL BOX (Half-Disassembly)

1. Remove the front grille. (Refer to section 2.1.1)
2. Remove the three screw which fasten the control box. (See Fig. 2)
3. Pull the control box from the barrier. (See Fig.2)
4. Discharge the capacitor by placing a 20,000 ohm resistor across the capacitor terminals.
5. Disconnect three wire housings in the control box.
6. Pull the control box forward completely.
7. Re-install the components by referring to the removal procedure. (See Fig. 2)  
(Refer to the circuit diagram found on page 25 in this manual and on the control box.)

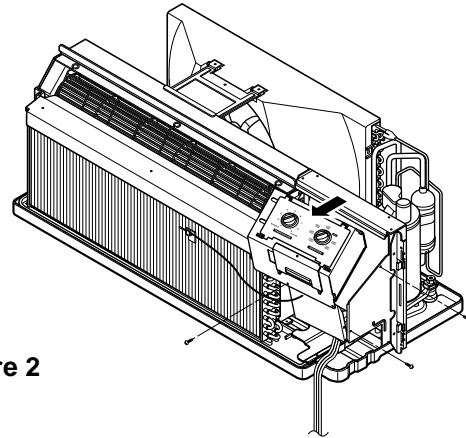


Figure 2

### 2.1.3 CONTROL BOX (Full-Disassembly)

1. Remove the front grille. (Refer to section 2.1.1)
2. Remove the 4 screws which fasten the control box cover. (See Fig.3)
3. Disconnect three wire housings in the control box.
4. Remove three screws which fasten the control box assembly.
5. Pull the control box assembly out from the unit.

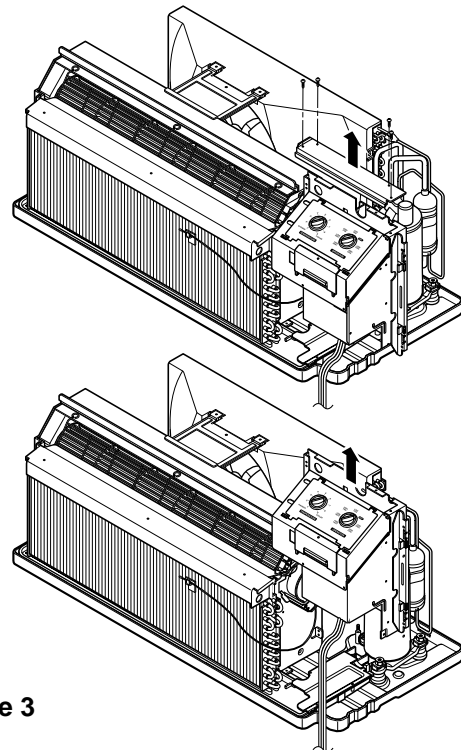


Figure 3

## 2.2 AIR HANDLING PARTS

### 2.2.1 HEATER ASSEMBLY AND CROSS FLOW FAN

1. Remove the front grille. (Refer to section 2.1.1)
2. Remove the control box assembly. (Refer to section 2.1.3)
3. Remove the 3 screws which fasten the net steel. (See Fig. 4)
4. Remove the 3 screws which fasten the electric heater assembly. (Electric heater model only) (See Fig.4).

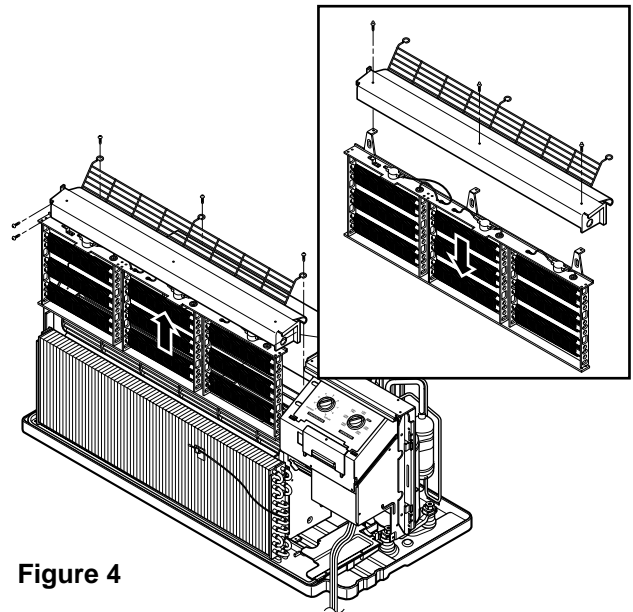


Figure 4

5. Loosen the hexagon screw with the Hex-wrench (See Fig.5)

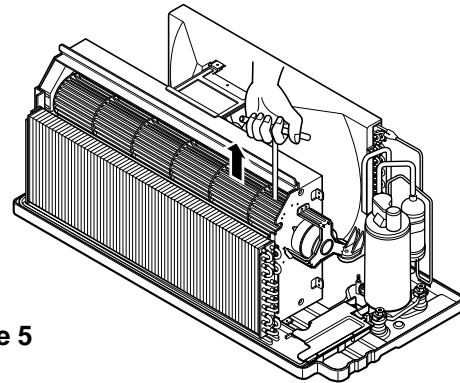


Figure 5

6. Remove the 4 screws which fasten the indoor motor and the earth wire. (See Fig. 5. 6)
7. Re-install the components by referring to the removal procedure, above.

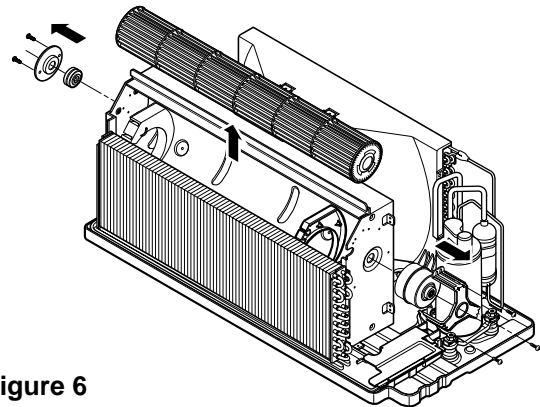


Figure 6

### 2.2.2 FAN

1. Remove the brace.
2. Remove the 4 screws which fasten the condenser with the shroud and the basepan.
3. Move the condenser sideways carefully.
4. Remove the clamp which secures the fan with pliers.
5. Remove the fan. (See Fig. 7)
6. Re-install the components by referring to the removal procedure, above.

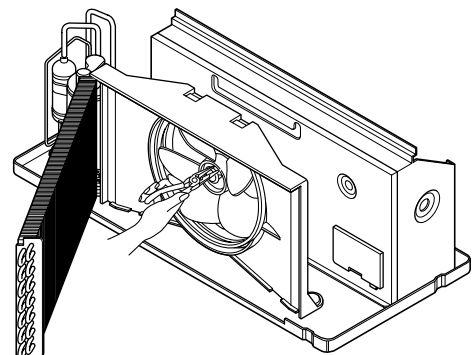


Figure 7

### 2.2.3 SHROUD

1. Remove the fan. (Refer to section 2.2.2)
2. Remove the screw which fastens the shroud.
3. Remove the shroud. (See Fig. 8)
4. Re-install the component by referring to the removal procedure, above.

## 2.3 ELECTRICAL PARTS

### 2.3.1 OUTDOOR MOTOR

1. Remove the clamp cord and disconnect a wire housing in control box. (Refer to section 2.1.2)
2. Remove the fan. (Refer to section 2.2.2)
3. Remove the 2 screws which fasten the motor. (See Fig. 9)
4. Remove the motor.
5. Re-install the components by referring to the removal procedure, above.

### 2.3.2 INDOOR MOTOR (Refer to section 2.2.1)

### 2.3.3 COMPRESSOR

1. Discharge the refrigerant system using Freon™ Recovery System.  
If there is no valve to attach the recovery system, install one (such as a WATCO A-1) before venting the Freon™. Leave the valve in place after servicing the system.
2. Disconnect the 3 leads from the compressor.
3. After purging the unit completely, unbraid the suction and discharge tubes at the compressor connections.
4. Remove the 3 nuts and the 3 washers which fasten the compressor. (See Fig. 10)
5. Remove the compressor.
6. Re-install the components by referring to the removal procedure, above.

### 2.3.4 CAPACITOR

1. Remove the control box. (Refer to section 2.1.2)
2. Remove 1 screw and disconnect the leads which connected to the box type capacitor. (See Fig. 11)
3. Remove 1 screw and the clamp which fastens the can-type capacitor. (See Fig. 11)
4. Disconnect all the leads of capacitor terminals.
5. Re-install the components by referring to the removal procedure, above.

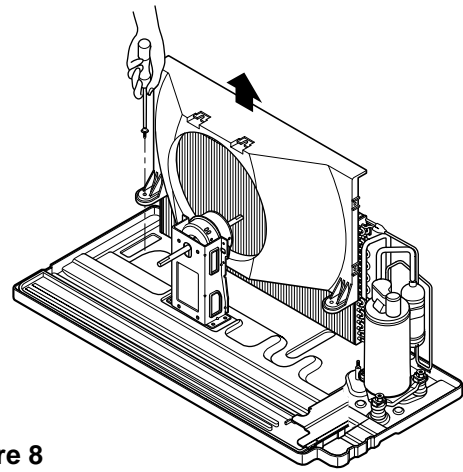


Figure 8

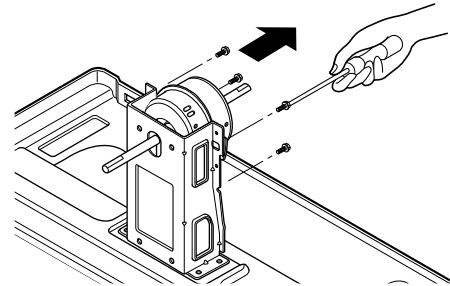


Figure 9

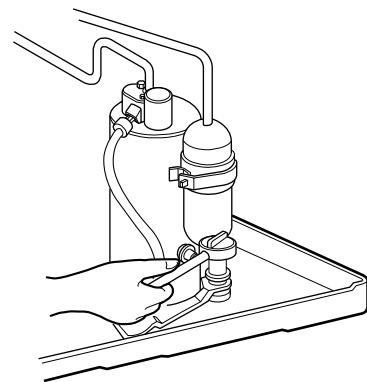


Figure 10

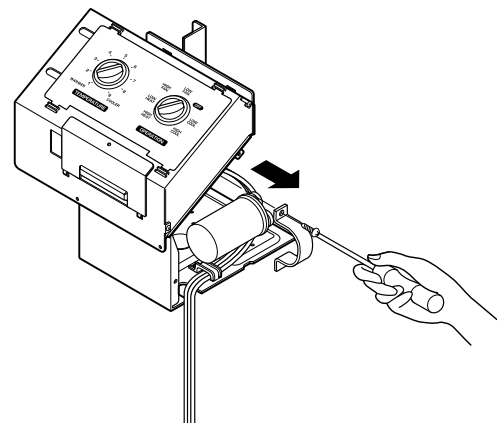


Figure 11

### 2.3.5 POWER CORD

1. Remove the control box. (Refer to section 2.1.2)
2. Disconnect the grounding screw from the control box.
3. Disconnect 2 receptacles.
4. Remove a screw which fastens the clip cord.
5. Separate the power cord from the control box.  
(See Fig. 12)
6. Re-install the component by referring to the removal procedure, above.  
(Use only one ground-marked hole  $\oplus$  for ground connection.)
7. If the supply cord of this appliance is damaged, it must be replaced by the special cord.  
(The special cord means the cord which has the same specification marked on the supply cord fitted to the unit.)

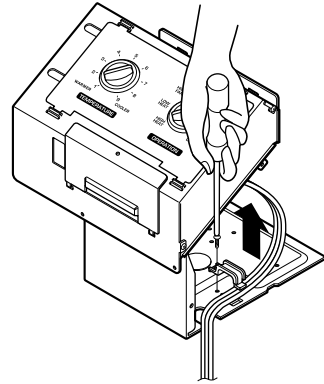


Figure 12

### 2.3.6 P.C.B.

1. Remove the escutcheon.
2. Remove the two knobs.
3. Remove the 2 screws which fasten P.C.B. cover.
4. Disconnect all the leads which connected to the P.C.B.
5. Remove the two screws which fasten the P.C.B. board.
6. Re-install the components by referring to the removal procedure, above.

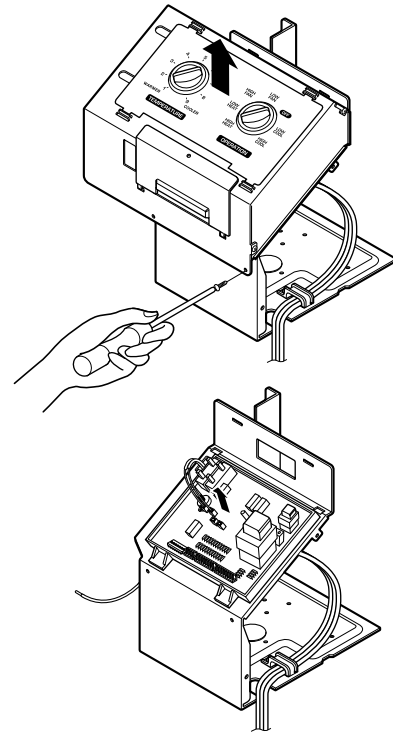


Figure 13

## 2.4 REFRIGERATION CYCLE

### CAUTION

Discharge the refrigerant system using Freon™ Recovery System.  
If there is no valve to attach the recovery system, install one (such as a WATCO A-1) before venting the Freon™. Leave the valve in place after servicing the system.

### 2.4.1 CONDENSER

1. Remove the brace and the shroud.  
(Refer to section 2.2.2)
2. Remove the 4 screws which fasten the shroud.  
(Refer to section 2.2.2)
3. Push forward the shroud and remove the 2 screws which fasten the condenser with the basepan.
4. After discharging the refrigerant completely, unbrazed the interconnecting tube at the condenser connections.
5. Remove the condenser.
6. Re-install the components by referring to notes.  
(See Fig. 14)

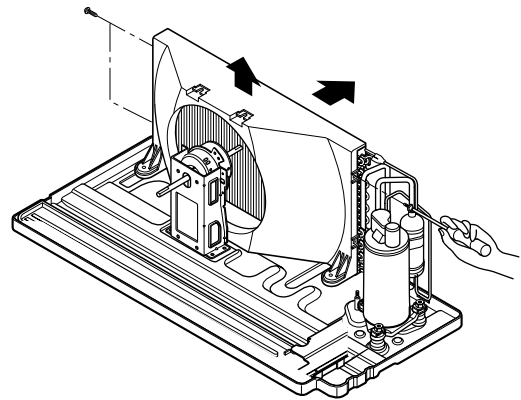


Figure 14

### 2.4.2 EVAPORATOR

1. Remove the front grille. (Refer to section 2.1.1)
2. Discharge the refrigerant completely.
3. Remove the control box assembly.  
(Refer to section 2.1.2)
4. Remove the 4 screws which fasten the evaporator at the left side and the right side.
5. Move the evaporator sideward carefully and then unbrazed the interconnecting tube at the evaporator connectors.
6. Remove the evaporator.
7. Re-install the components by referring to notes.  
(See Fig. 15)

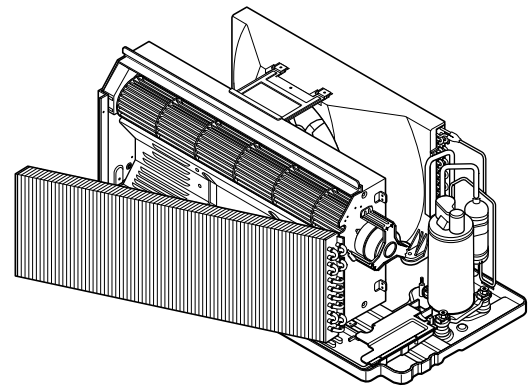


Figure 15

### 2.4.3 CAPILLARY TUBE

1. After discharging the refrigerant completely, unbrazed the interconnecting tube at the capillary tube.
2. Remove the capillary tube.
3. Re-install the components by referring to notes.

## NOTES

---

— Replacement of the refrigeration cycle.

1. When replacing the refrigeration cycle, be sure to discharge the refrigerant system using a Freon™ recovery System.  
If there is no valve to attach the recovery system, install one (such as a WATCO A-1) before venting the Freon™. Leave the valve in place after servicing the system.
2. After discharging the unit completely, remove the desired component, and unbraid the pinch-off tubes.
3. Solder service valves into the pinch-off tube ports, leaving the valves open.
4. Solder the pinch-off tubes with Service valves.
5. Evacuate as follows.
  - 1) Connect the vacuum pump, as illustrated Fig. 16A.
  - 2) Start the vacuum pump, slowly open manifold valves A and B with two full turns counterclockwise and leave the valves closed. The vacuum pump is now pulling through valves A and B up to valve C by means of the manifold and entire system.

### CAUTION

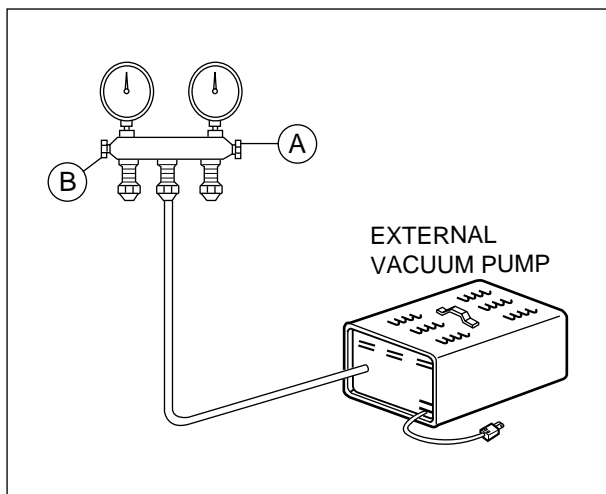
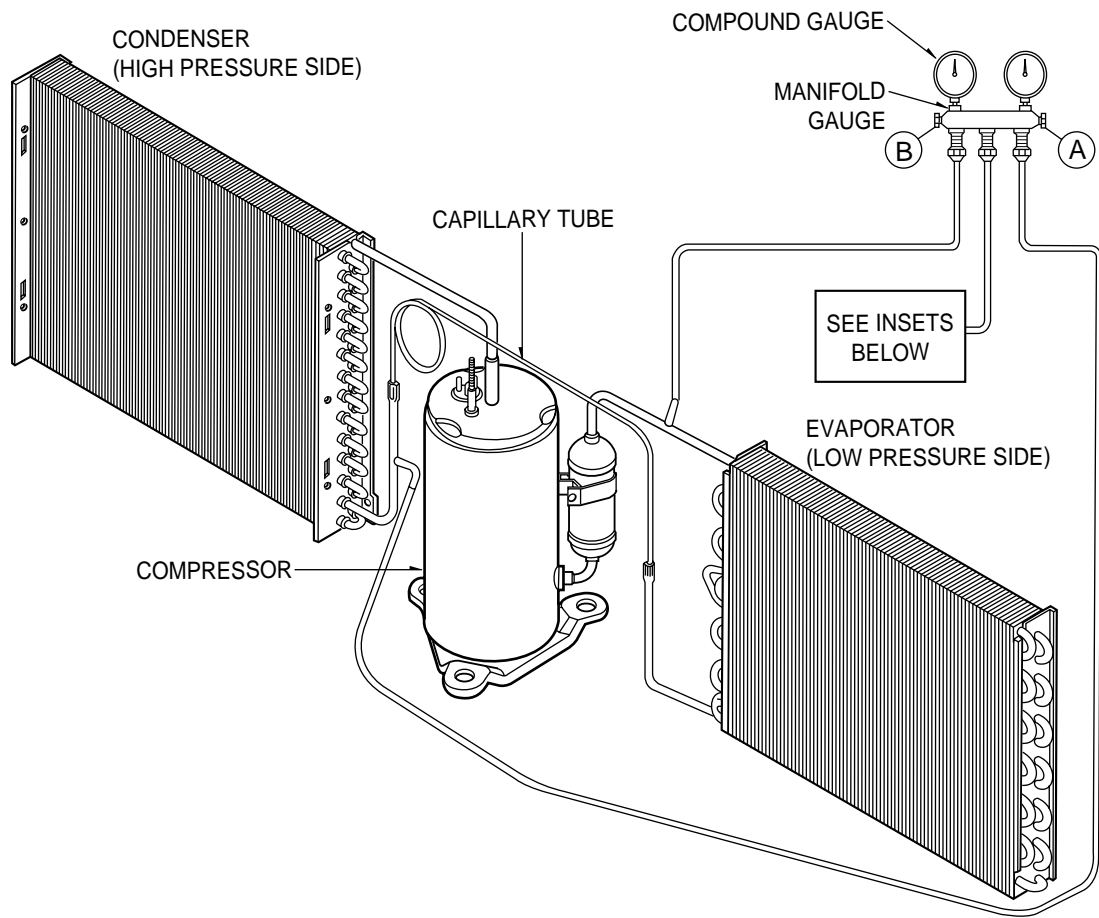
If high vacuum equipment is used, just crack valves A and B for a few minutes, then open slowly with the two full turns counterclockwise. This will keep oil from foaming and being drawn into the vacuum pump.

- 3) Operate the vacuum pump for 20 to 30 minutes, until 600 microns of vacuum is obtained. Close valves A and B, and observe vacuum gauge for a few minutes. A rise in pressure would indicate a possible leak or moisture remaining in the system. With valves A and B closed, stop the vacuum pump.
- 4) Remove the hose from the vacuum pump and place it on the charging cylinder. See Fig. 16B. Open valve C.  
Discharge the line at the manifold connection.
- 5) The system is now ready for final charging.

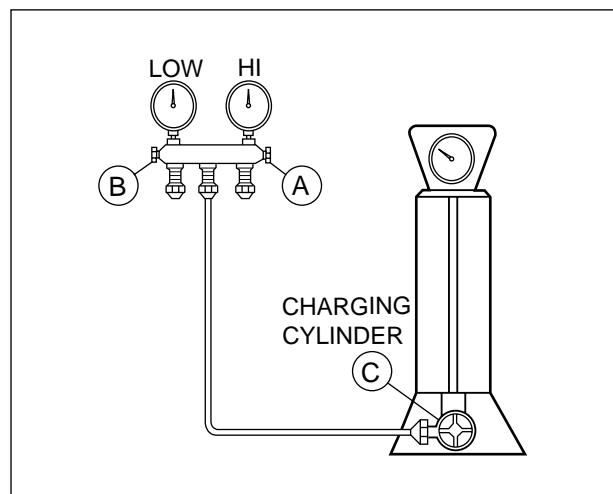
6. Recharge as follows :

- 1) Refrigeration cycle systems are charged from the High-side. If the total charge cannot be put in the High-side, the balance will be put in the suction line through the access valve which you installed as the system was opened.
- 2) Connect the charging cylinder as shown in Fig. 16B. With valve C open, discharge the hose at the manifold connection.
- 3) Open valve A and allow the proper charge to enter the system. Valve B is still closed.
- 4) If more charge is required, the high-side will not take it. Close valve A.
- 5) With the unit running, open valve B and add the balance of the charge.
  - a. Do not add the liquid refrigerant to the Low-side.
  - b. Watch the Low-side gauge; allow pressure to rise to 30 lbs.
  - c. Turn off valve B and allow pressure to drop.
  - d. Repeat steps B and C until the balance of the charge is in the system.
- 6) When satisfied the unit is operating correctly, use the pinch-off tool with the unit still running and clamp on to the pinch-off tube. Using a tube cutter, cut the pinch-off tube about 2 inches from the pinch-off tool. Use sil-fos solder and solder pinch-off tube closed. Turn off the unit, allow it to set for a while, and then test the leakage of the pinch-off connection.

**Equipment needed:** Vacuum pump, Charging cylinder, Manifold gauge, Brazing equipment. Pinch-off tool capable of making a vapor-proof seal, Leak detector, Tubing cutter, Hand Tools to remove components, Service valve.



**Figure 16A-Pulling Vacuum**



**Figure 16B-Charging**



# 3. INSTALLATION

## 3.1 HOW TO INSTALL THE UNIT

### CAUTION

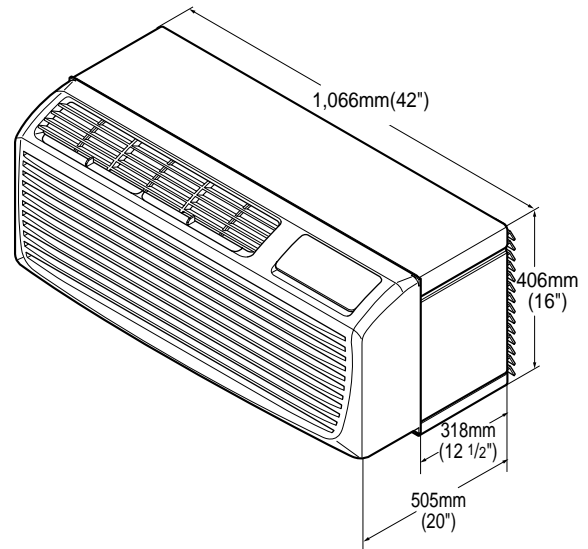
- There are sharp edges that can cause serious cuts.
- When lifting the air conditioner, it is HEAVY. Use 2 peoples to lift.

For existing sleeve, you should measure the wall sleeve dimensions.

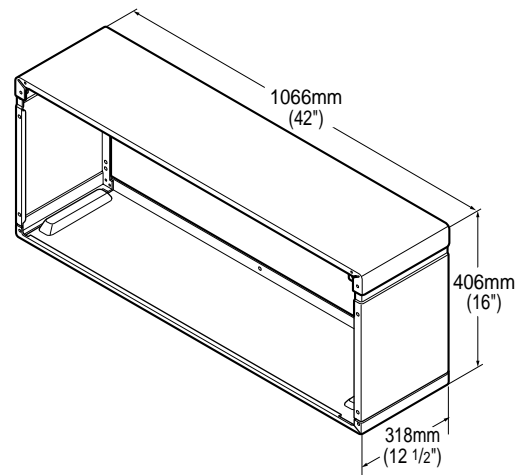
You can install the new air conditioner according to these installation instructions to achieve the best performance. All wall sleeves used to mount the new air conditioner must be in good structural condition and have the rear grille that securely attaches to the sleeve or the flange of the sleeve to secure the new air conditioner.

- To avoid vibration and noise, make sure the unit is installed securely and firmly.

Dimension of air conditioner



Dimension of sleeve assembly (optional)



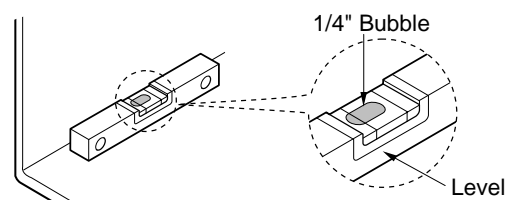
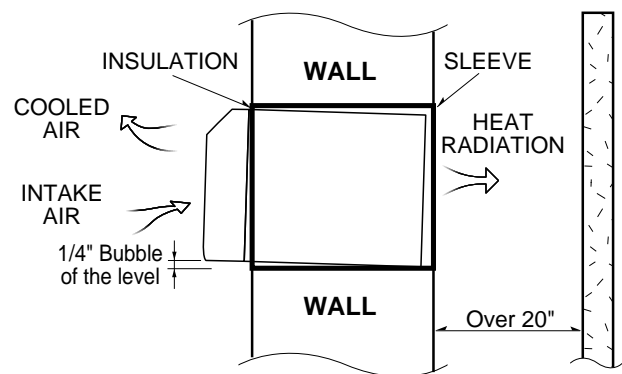
### A. BEFORE ATTACHING THE FRONT GRILLE TO THE SLEEVE, IF YOU WANT TO PULL OUT THE FILTER UPWARD;

1. There should be no obstacle, like a fence, within 20" which might restrict heat radiation from the condenser.

### B. IF YOU WANT TO PULL OUT THE FILTER DOWNWARD;

The grille is already designed for that way.

1. Install the unit a little obliquely outward not to leak the condensed water into the room (about 1/2" or 1/4" bubble with level).
2. Install the unit with its bottom portion 30~60" above the floor level.
3. The power cord must be connected to an independent circuit. The green wire must be grounded.



## 3.2 SUGGESTED TOOL REQUIREMENTS

SCREWDRIVER(+, -), RULER, KNIFE, HAMMER, PENCIL, LEVEL

### 3.2.1 PREPARATION OF SLEEVE

#### SLEEVE HARDWARE

NUMBER	NAME OF PARTS	Q'TY
①	SLEEVE LOWER	1
②	SLEEVE UPPER	1
③	SCREW	4
④	OUTDOOR GRILLE	1
⑤	DRAIN KIT	1

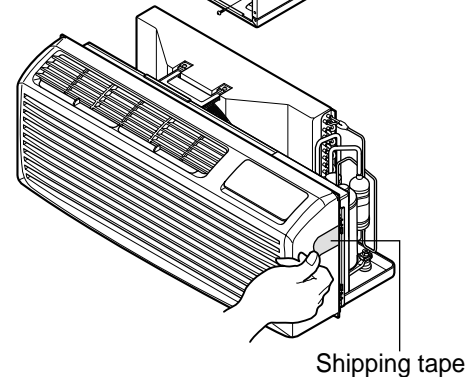
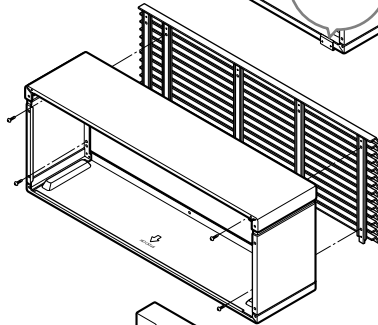
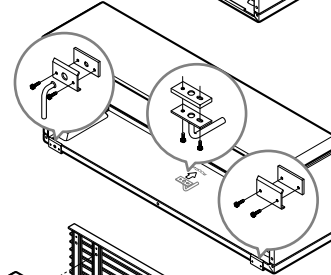
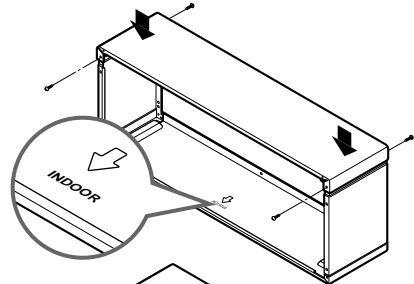
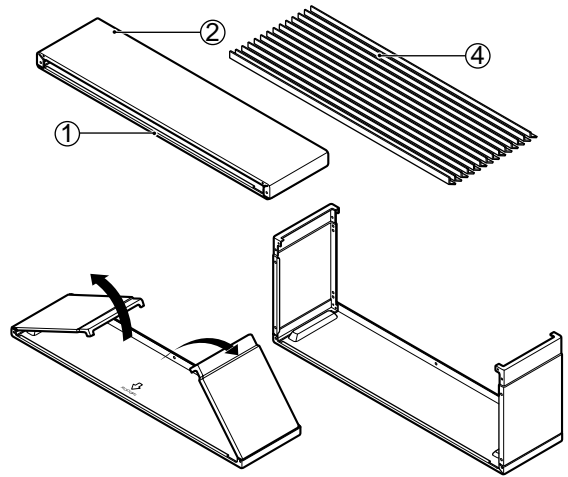
#### ASSEMBLE THE WALL SLEEVE

- Raise the sleeve side panels to upright position as shown on the right.

- Place sleeve upper on top of side panels.
- Fasten the four screws as shown on the right.

- Assemble drain kit.
- Fasten this assembly to the each side of the wall sleeve as shown on the right.

- Assemble the outdoor grille and fasten the 4 screws as shown on the right.



### 3.2.2 PREPARATION OF THE FRONT GRILLE

Carefully remove shipping tape, if there is any, from the front grille.

### 3.2.3 UNIT INSTALLATION

1. Remove the shipping screw from the ventilation door.  
(See Fig. 17)

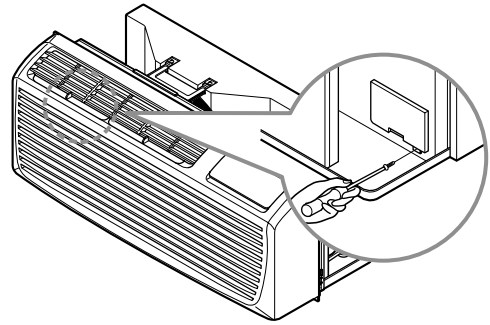


Figure 17

2. Remove the front grille by pulling it out at the bottom to release it, then lift it up along the unit top front.  
(See Fig. 18)

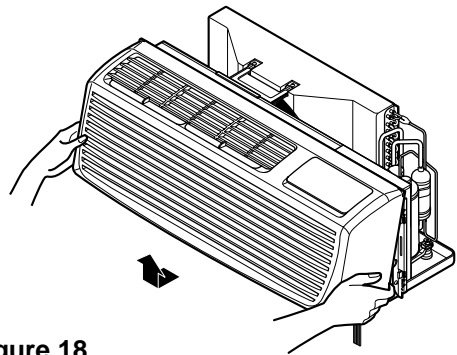


Figure 18

3. Slide the unit into the wall sleeve and secure with 6 screws through the unit flange holes. (See Fig. 19)

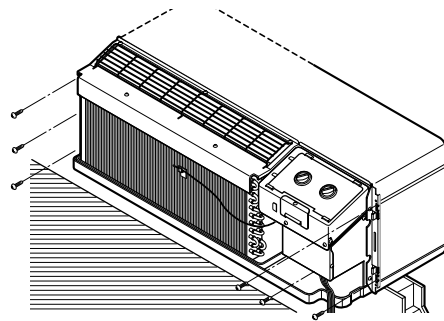


Figure 19

4. Reinstall the front grille by hooking the top over the unit top, then pushing it in at the bottom. (See Fig. 20)

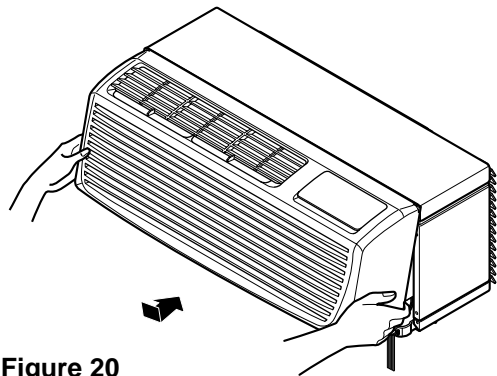


Figure 20

## 3.3 ELECTRICAL REQUIREMENTS

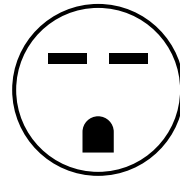
### 3.3.1 ELECTRICAL DATA (FOR 230/208V MODEL)

#### CAUTION

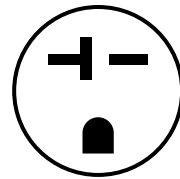
1. Do not use an extension cord with this unit.
2. When the unit is in the OFF position, the power supply to the electrical controls.
3. Disconnect the power to the unit before servicing the unit.
4. Remove the power cord from the wall receptacle.
5. Remove or turn off the protective device (fuses or circuit breaker).

Wirings including installation of the receptacle must comply with the NEC and local codes, local regulations.

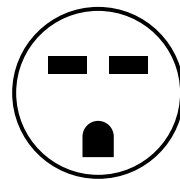
**FUSE-** Use a time-delay fuse or circuit breaker. Refer to the nameplate for proper power supply requirements.



***Tandem***  
15 A



***Perpendicular***  
20 A



***Large Tandem***  
30 A

***230/208 volt receptacle configuration***

### 3.3.2 ELECTRICAL SAFETY

#### IMPORTANT GROUNDING INSTRUCTIONS

Air conditioner has a three-prong grounding plug on its power supply cord, which must be plugged into properly grounded three-prong wall receptacle for your protection against possible shock hazard.

**FUSE** – Use a time-delay fuse or circuit breaker. Refer to the nameplate for proper power supply requirements.

#### **208, 230, and 208/230 VOLT UNITS**

These units are equipped with a three-prong grounding plug on the power supply cord, which must be plugged into a matching properly grounded three-prong wall receptacle for your protection against possible shock hazard. If such an outlet is not present, one must be installed by a qualified electrician in accordance with the National Electrical Code and local codes and ordinances.

**NOTE:** DO NOT USE AN EXTENSION CORD on 208, 230, and 208/230 Volt units.

## 4. PERFORMANCE DATA

### Air Conditioner Performance Data

	LP120CEM			
	208	230	208	230
Voltage (V)				
<b>Cooling Data</b>				
Cooling Capacity (Btu/h)		11,500		11,800
Cooling Amps (A)		4.8		5.2
Cooling Power (W)		1025		1055
EER (Btu/Watt)		11.0		11.0
Moisture Removal (Pts/h)		3.3		3.3
<b>Airflow</b>				
Indoor CFM (Wet) @0.3ESP (Hi)		300		330
Indoor CFM (Wet) @0.3ESP (Lo)		290		290
Indoor CFM (Dry) @0.3ESP (Hi)		320		350
Indoor CFM (Dry) @0.3ESP (Lo)		280		310

### Heat Pump Performance Data

	LP120HEM				LP090HEM	
	208	230	208	230	208	230
Voltage (V)						
<b>Cooling Data</b>						
Cooling Capacity (Btu/h)		11,800		12,100	9,000	9,300
Cooling Amps (A)		5.4		5.0	3.9	3.7
Cooling Power (W)		1,065		1,090	775	800
EER (Btu/Watt)		11.1		11.1	11.6	11.6
Moisture Removal (Pts/h)		3.3		3.3	3.4	3.4
<b>Heat Pump Heating Data</b>						
Heating Capacity (Btu/h)		10,700		10,900	8,000	8,200
Heating Amps (A)		4.8		4.4	3.5	3.2
Heating Power (W)		950		970	690	705
COP (W/W)		3.3		3.3	3.4	3.4
<b>Airflow</b>						
Indoor CFM (Wet) @0.3ESP (Hi)		240		270	310	340
Indoor CFM (Wet) @0.3ESP (Lo)		190		230	270	300
Indoor CFM (Dry) @0.3ESP (Hi)		260		290	330	360
Indoor CFM (Dry) @0.3ESP (Lo)		220		250	290	330

## Cooling Wattage - Air Conditioners

Model		LP120CEM	
Temperature			
Outdoor Air Dry Bulb	Return Air Wet Bulb	Total Wattage Input	
		Min	Max
Rating Wattage		1045	1090
100	85	1050	1180
	80	1055	1180
	75	1060	1180
	70	1055	1180
	65	1050	1180
	60	1045	1175
	55	1030	1160
95	85	1000	1125
	80	1005	1130
	75	1005	1135
	70	1005	1130
	65	1000	1125
	60	990	1120
	55	980	1105
90	85	950	1070
	80	950	1075
	75	955	1080
	70	950	1075
	65	950	1070
	60	940	1060
	55	930	1055
85	85	895	1020
	80	900	1020
	75	905	1030
	70	900	1020
	65	895	1020
	60	890	1010
	55	880	1000
80	85	850	970
	80	850	970
	75	850	975
	70	850	970
	65	850	970
	60	940	960
	55	830	950

## Cooling Wattage - Heat Pumps

Model		LP090HM*		LP120HEM	
Temperature					
Outdoor Air Dry Bulb	Return Air Wet Bulb	Total Wattage Input		Total Wattage Input	
		Min	Max	Min	Max
Rating Wattage		810	850	1120	1145
100	85	830	935	1120	1230
	80	835	940	1125	1235
	75	835	940	1130	1240
	70	835	940	1125	1240
	65	830	935	1120	1230
	60	820	925	1115	1230
	55	810	915	1100	1210
95	85	785	890	1070	1180
	80	790	890	1075	1190
	75	795	890	1075	1190
	70	790	890	1075	1190
	65	785	890	1070	1180
	60	780	880	1060	1170
90	85	745	845	1020	1130
	80	750	850	1025	1135
	75	750	850	1025	1135
	70	750	850	1025	1125
	65	745	845	1020	1130
	60	735	835	1010	1120
85	85	700	800	970	1080
	80	705	800	975	1085
	75	705	810	975	1085
	70	705	800	975	1085
	65	700	800	970	1080
	60	690	790	960	1070
80	85	655	755	920	1030
	80	660	760	925	1030
	75	660	760	925	1035
	70	660	760	920	1030
	65	655	755	920	1030
	60	650	745	910	1020
	55	635	735	900	1010

## Cooling change of temperature - Air Conditioners

Room Air Dry Bulb	Room Air Wet Bulb	LP120CEM	
		Temperature Across Indoor Coil ( $\Delta T$ )	
		Min	Max
Rating Btu/h		11700	12000
Rating CFM		300	330
90	85	1	5
	80	9	13
	75	18	22
	70	26	30
85	80	5	10
	75	13	18
	70	21	25
	65	29	33
80	75	9	13
	70	15	20
	65	23	26
	60	29	33
75	70	10	15
	65	15	20
	60	21	25
	55	26	30
70	65	9	13
	60	13	17
	55	18	21

## Cooling Change of Temperature - Heat Pumps

Room Air Dry Bulb	Room Air Wet Bulb	Model			
		LP090HEM		LP120HEM	
		Temperature Across Indoor Coil ( $\Delta T$ )		Temperature Across Indoor Coil ( $\Delta T$ )	
		Min	Max	Min	Max
Rating Btu/h		9300	9600	12300	12600
Rating CFM		240	270	310	340
90	85	2	6	1	5
	80	11	15	10	13
	75	19	22	18	22
	70	29	30	26	30
85	80	7	11	5	10
	75	15	18	14	18
	70	23	25	21	25
	65	31	33	30	33
80	75	11	15	10	13
	70	18	20	16	20
	65	24	27	23	26
	60	32	33	30	33
75	70	13	16	11	15
	65	18	21	16	20
	60	23	26	21	25
	55	29	31	26	30
70	65	12	15	10	13
	60	16	18	14	17
	55	20	22	18	21



## Heating Change of Temperature - Heat Pumps

		Model			
Room Air Dry Bulb	Room Air Wet Bulb	LP090HEM		LP120HEM	
		Temperature Across Indoor Coil ( $\Delta T$ )		Temperature Across Indoor Coil ( $\Delta T$ )	
		Min	Max	Min	Max
Rating Btu/h		8200	8400	10900	11200
Rating CFM		260	290	330	360
50	85	24	27	27	30
	80	25	28	28	31
	75	26	29	29	32
	70	28	30	31	34
	65	28	30	31	34
45	85	22	24	24	29
	80	23	25	25	29
	75	24	26	26	30
	70	24	27	27	31
	65	25	28	28	32
40	85	20	22	23	27
	80	21	23	23	28
	75	22	24	24	29
	70	23	24	25	29
	65	24	25	26	30
35	85	17	20	21	24
	80	18	21	22	25
	75	19	22	23	26
	70	20	23	23	27
	65	21	24	24	28

## Cooling Ampere Chart - Air Conditioners

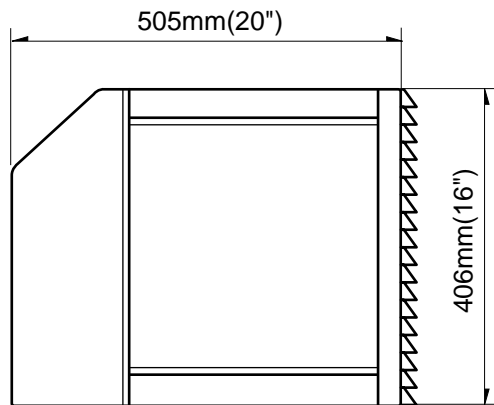
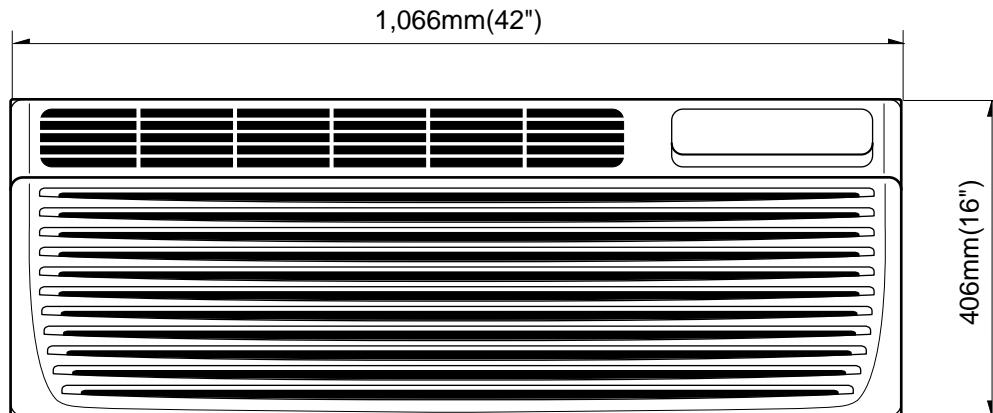
Cond Inlet Air Temperature	Model	
	LP120CEM	
Amperage		
Min Max		
Rating Ampere	4.8	5.2
100	5.6	5.6
95	5.4	5.3
90	5.2	5.1
85	4.9	4.8
80	4.7	4.6

## Cooling Ampere Chart - Heat Pumps

Cond Inlet Air Temperature	Model		Model	
	LP090HM*		LP120HEM	
Amperage				
Min Max				
Rating Ampere	3.6	3.9	4.8	5.2
100	3.4	4.0	5.6	5.5
95	3.2	3.8	5.3	5.2
90	3.1	3.6	5.0	5.0
85	3.1	3.4	4.8	4.7
80	2.9	3.3	4.6	4.5

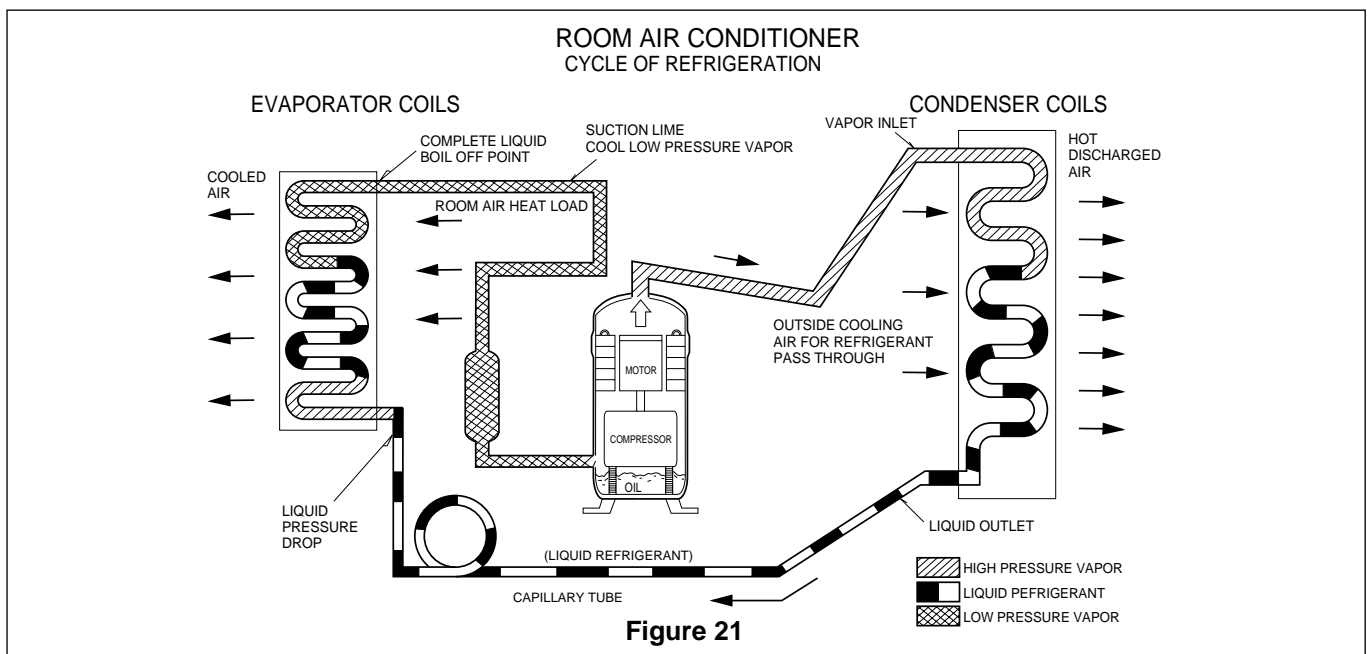
# 5. TROUBLESHOOTING GUIDE

## 5.1 OUTSIDE DIMENSIONS



## 5.2 PIPING SYSTEM

Following is a brief description of the important components and their functions in the refrigeration system. Refer to Fig. 21 to follow the refrigeration cycle and the flow of the refrigerant in the cooling cycle.

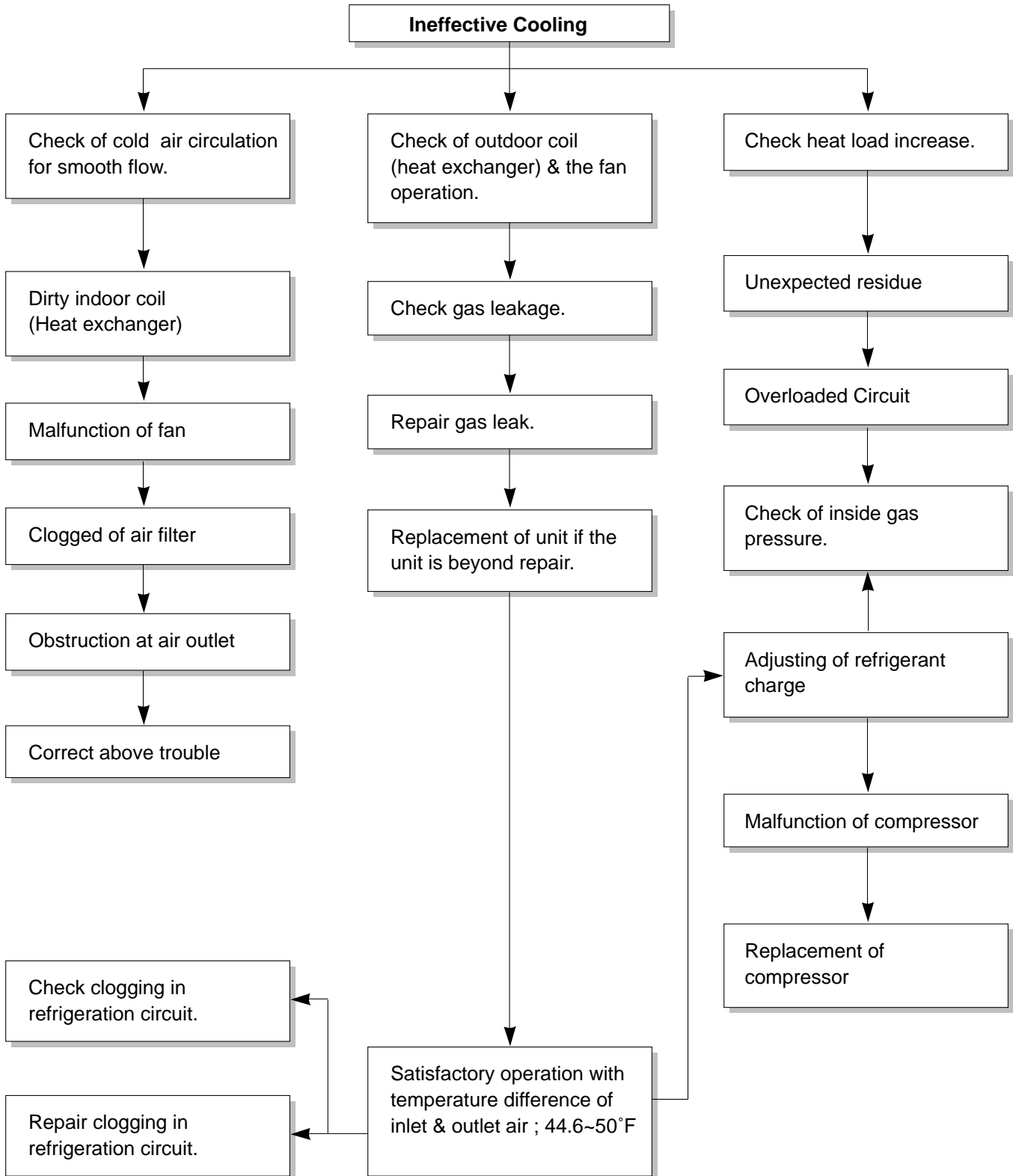


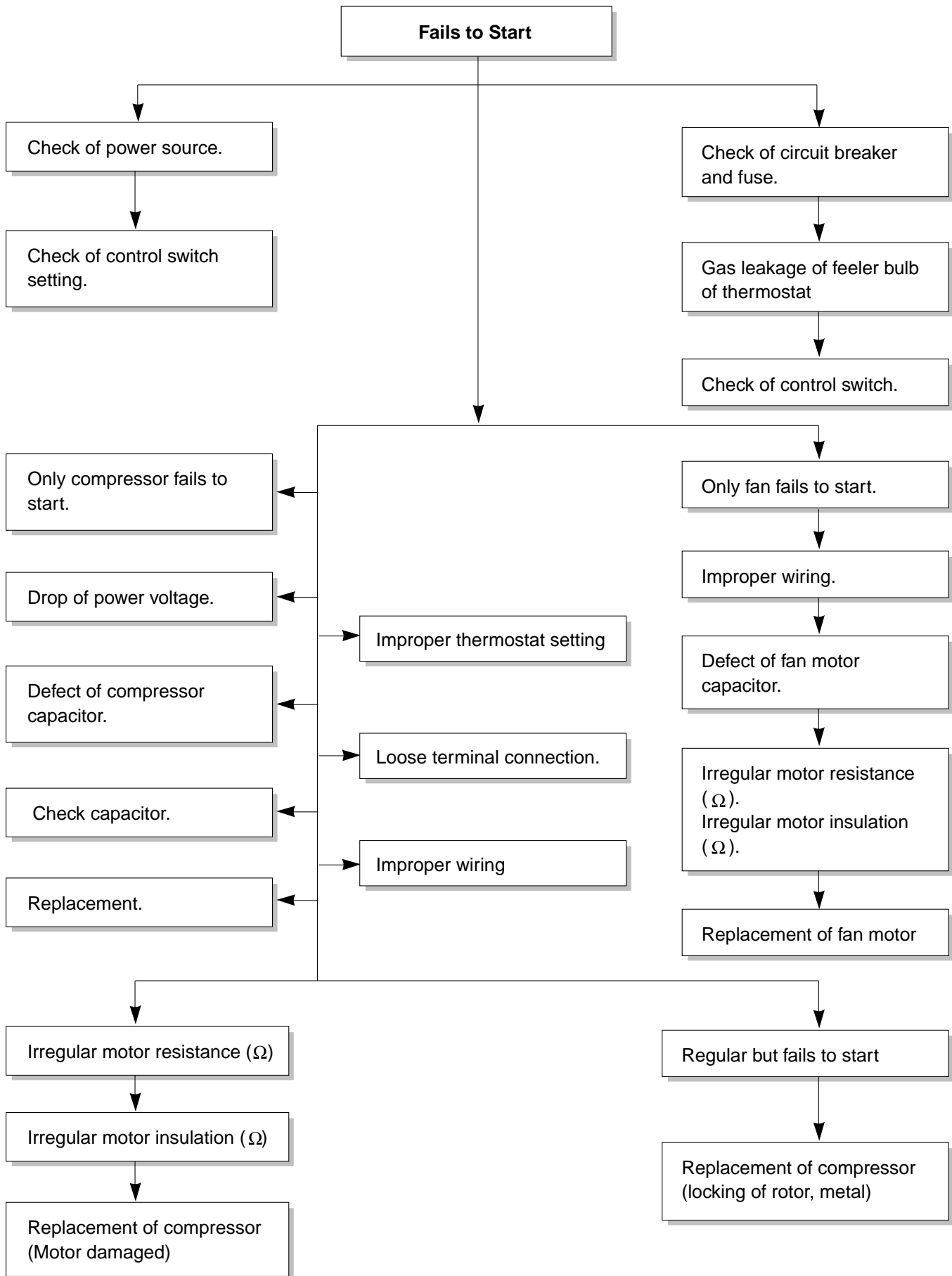
## 5.3 TROUBLESHOOTING GUIDE

In general, possible trouble is classified in two causes.

The one is called Starting Failure which is caused from an electrical defect, and the other is Ineffective Air Conditioning caused by a defect in the refrigeration circuit and improper application.

### Unit is running but cooling is ineffective





COMPLAINT	CAUSE	REMEDY
Fan motor will not run.	No power	Check voltage at outlet. Correct if none.
	Power supply cord	Check voltage to rotary switch. If none, check power supply cord. Replace cord if circuit is open.
	Rotary switch	Check switch continuity. Refer to wiring diagram for terminal identification. Replace switch if defective.
	Wire disconnected or connection loose	Connect wire. Refer to wiring diagram for terminal identification. Repair or replace loose terminal.
	Capacitor (Discharge capacitor before testing.)	Test capacitor. Replace if not within $\pm 10\%$ of manufacturer's rating. Replace if shorted, open, or damaged.
	Will not rotate	<p>Fan blade hitting shroud or cross flow fan hitting scroll. Realign assembly.</p> <p>Units using slinger ring condenser fans must have <math>\frac{1}{4}</math> to <math>\frac{5}{16}</math> inch clearance to the base. If it is hitting the base, shim up the bottom of the fan motor with mounting screw(s).</p> <p>Check fan motor bearings; if motor shaft will not rotate, replace the motor.</p>
Fan motor runs intermittently	Revolves on overload.	<p>Check voltage. See limits on this page. If not within limits, call an electrician.</p> <p>Test capacitor. Check bearings. Does the fan blade rotate freely? If not, replace fan motor.</p> <p>Pay attention to any change from high speed to low speed. If the speed does not change, replace the motor.</p>
Fan motor noise.	Grommets	Check grommets; if worn or missing, replace them.
	Fan	If cracked, out of balance, or partially missing, replace it.
	Turbo fan	If cracked, out of balance, or partially missing, replace it.
	Loose set screw	Tighten it.
	Worn bearings	If knocking sounds continue when running or loose, replace the motor. If the motor hums or noise appears to be internal while running, replace motor.

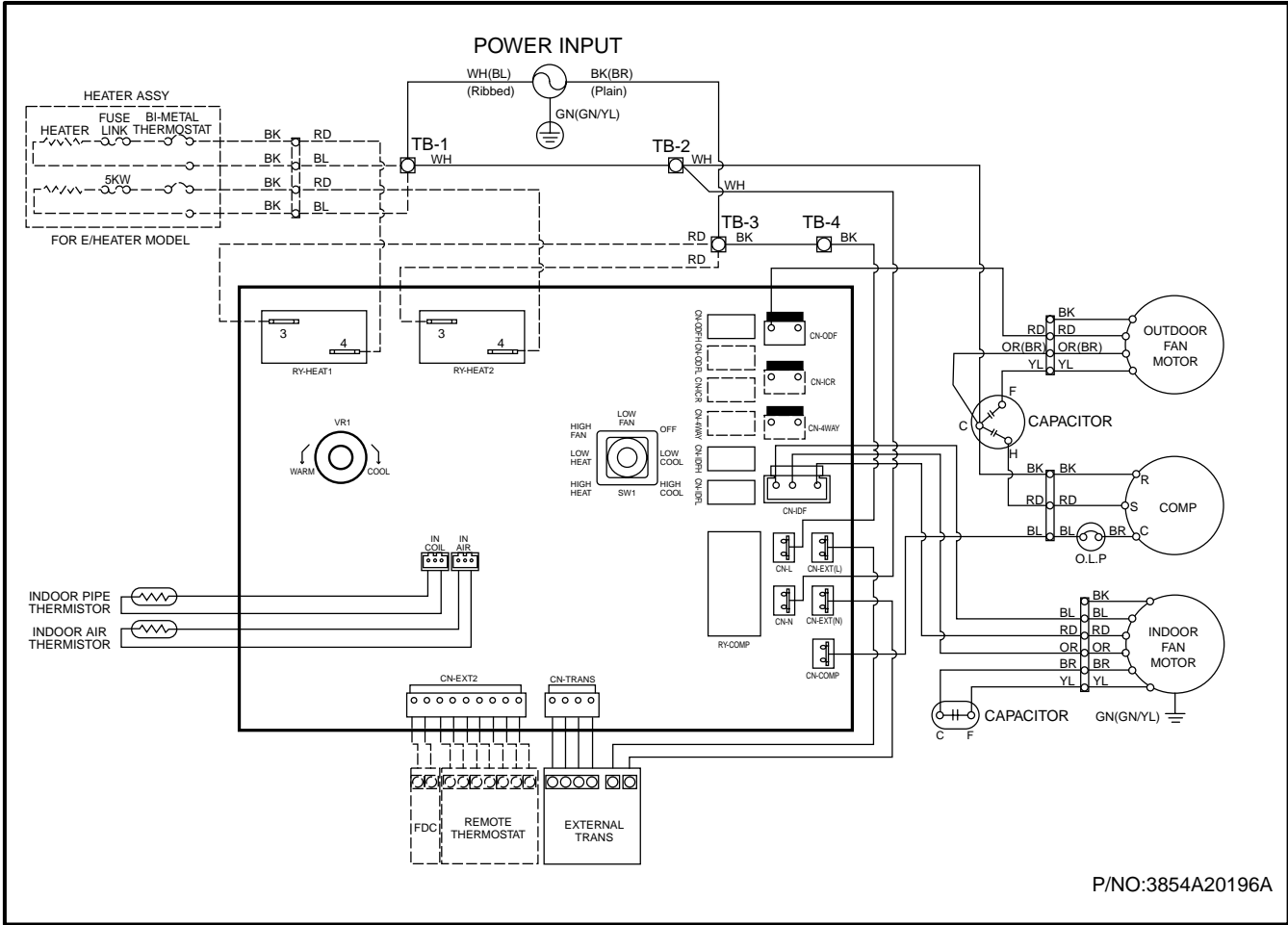
<b>COMPLAINT</b>	<b>CAUSE</b>	<b>REMEDY</b>
Compressor will not run, but fan motor runs.	Voltage	Check voltage. See the limits on the preceding page. If not within limits, call an electrician.
	Wiring	Check the wire connections, if loose, repair or replace the terminal. If wires are off, refer to wiring diagram for identification, and replace. Check wire locations. If not per wiring diagram, correct.
	Rotary	Check for continuity, refer to the wiring diagram for terminal identification. Replace the switch if circuit is open.
	Thermostat	Check the position of knob. If not at the coldest setting, advance the knob to this setting and restart unit. Check continuity of the thermostat. Replace thermostat if circuit is open.
	Capacitor (Discharge capacitor before servicing.)	Check the capacitor. Replace if not within $\pm 10\%$ of manufacturer's rating. Replace if shorted, open, or damaged.
	Compressor	Check the compressor for open circuit or ground. If open or grounded, replace the compressor.
	Overload	Check the compressor overload, if externally mounted. Replace if open. (If the compressor temperature is high, remove the overload, cool it, and retest.)

## ROOM AIR CONDITIONER VOLTAGE LIMITS

<b>NAME PLATE RATING</b>	<b>MINIMUM</b>	<b>MAXIMUM</b>
208/230V	187V	253V

<b>COMPLAINT</b>	<b>CAUSE</b>	<b>REMEDY</b>
Compressor cycles on overload.	Voltage	Check the voltage. See the limits on the preceding page. If not within limits, call an electrician.
	Overload	Check overload, if externally mounted. Replace if open. (If the compressor temperature is high, remove the overload, cool, and retest.)
	Fan motor	If not running, determine the cause. Replace if required.
	Condenser air flow restriction	Remove the cabinet. inspect the interior surface of the condenser; if restricted, clean carefully with a vacuum cleaner (do not damage fins) or brush. Clean the interior base before reassembling.
	Condenser fins (damaged)	If condenser fins are closed over a large area on the coil surface, head pressures will increase, causing the compressor to cycle. Straighten the fins or replace the coil.
	Capacitor	Test capacitor.
	Wiring	Check the terminals. If loose, repair or replace.
Insufficient cooling or heating	Refrigerating system	Check the system for a restriction.
	Air filter	If restricted, clean or replace.
	Exhaust damper door	Close if open.
Excessive noise.	Unit undersized	Determine if the unit is properly sized for the area to be cooled.
	Cross flow fan	Check the set screw or clamp. If loose or missing, correct. If the blower or fan is hitting air guide, rearrange the air handling parts.
	Copper tubing	Carefully rearrange tubing not to contact, compressor, shroud, and barrier.

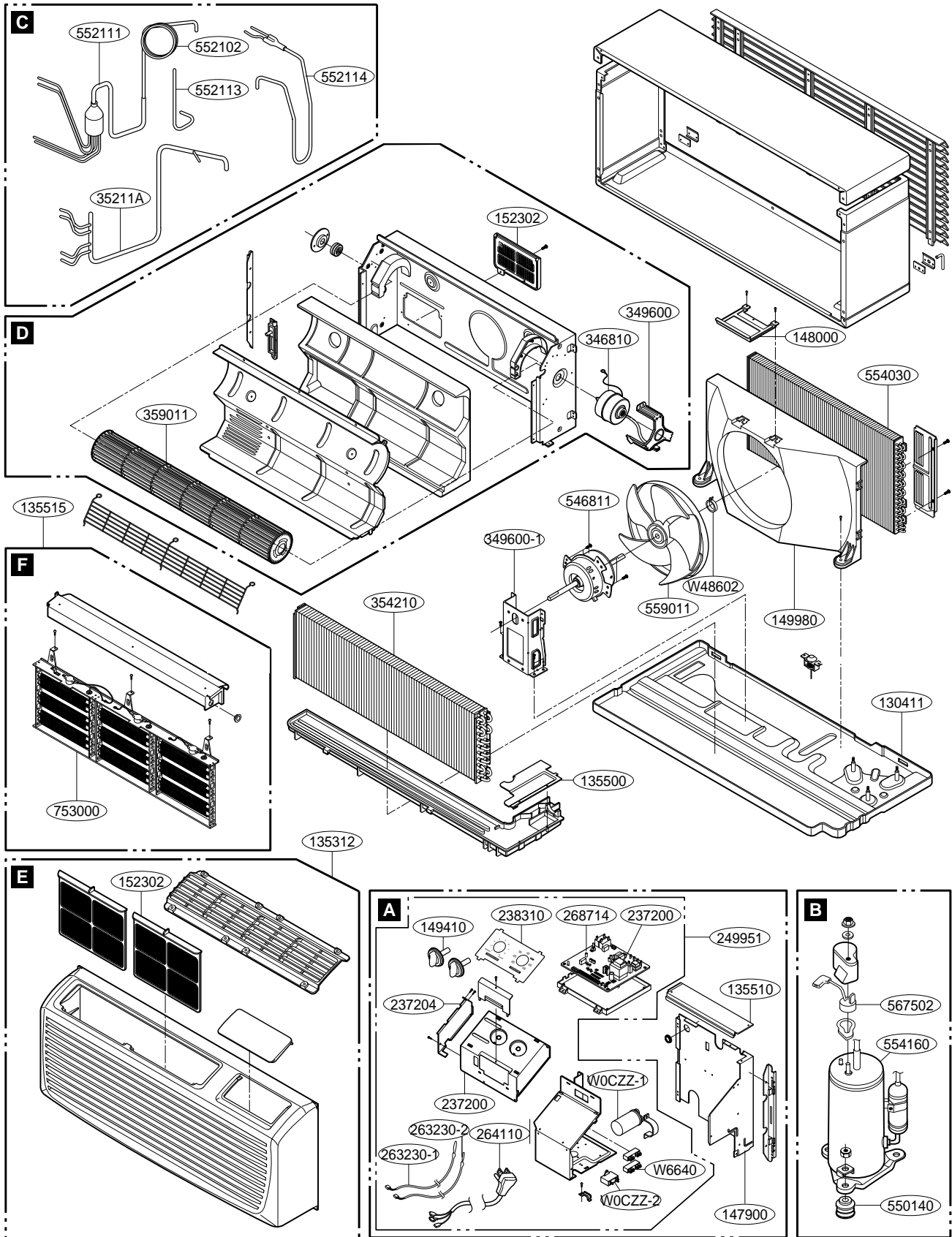
# 6. SCHEMATIC DIAGRAM



LOCATION NO.	DESCRIPTION	Q'TY PER SET	REMARKS
1	POWER CORD	1	
2	MOTOR	INDOOR	1
		OUTDOOR	1
3	CAPACITOR	BOX TYPE	1
		CAN TYPE	1
4	THERMOSTAT	1	
5	COMPRESSOR	1	
6	OVERLOAD PROTECTOR	1	



# 7. EXPLODED VIEW



## 8. REPLACEMENT PARTS LIST

	LOCATION NO.	DESCRIPTION	PART NO.			REMARK
			LP090HEM	LP120CEM	LP120HEM	
<b>A</b>	249951	CONTROL BOX,ASM(INDOOR)	4995A20466U	4995A20463W	4995A20463U	
	264110	POWER CORD ASM	6411A20048M			
	268714	PCB ASM(MAIN)	6871A10082J		6871A10082C	
	149410	KNOB ASM	4941A30015B			
	237200	PANEL ASM,CONTROL	3720A20169A			
	237204	PANEL,SIDE	3720A20186A			
	238310	ESCUTCHEON	3831A30008A			
	263230	THERMISTOR ASM	6323A20003K			
	263230	THERMISTOR ASM	6323A20006A			
	WOCZZ	CAPACITOR,DRAWING(INDOOR)	3H00660C			
	WOCZZ	CAPACITOR,DRAWING(OUTDOOR)	6120AR2194A	6120AR2194D	6120AR2194B	
	W6640	TERMINAL BLOCK	3H00390A			
	261704	TRANSFORMER,POWER	6170A20012A			
	249940	CONTROL BOS ASM,SINGLE	4994A20052A			
	147900	BARRIER,SINGLE	4790A20033A			
	135510	COVER ASM(CONTROL)	3551A20062G			
<b>B</b>	554160	COMPRESSOR SET	2520UKYK2BA	2520UKLK2BA	2520UKHK2AA	
	550140	ISOLATOR,COMP	4H00982E			
	567502	O.L.P	6750U-L014A	6750U-L061A	6750U-L039A	
<b>C</b>	35211A	TUBE ASM,SUCTION	-	5211A21365A	-	
	552114	TUBE ASM,DISCHARGE	-	5211A20531A	-	
	552111	TUBE ASM,CAPILLARY	-	5211A20623D	-	
	552113	TUBE ASM, CONDENSER OUT	-	5211A30434A	-	
	552102	TUBE CAPILLARY,BEND	-	5210A22614D	-	
<b>D</b>	147911	BARRIER ASM,INDOOR	4791A10005D	4791A10005A		
	346810	MOTOR ASM(INDOOR)	4681A20064E	4681A20064A		
	349600	MOUNT,MOTOR	4960A20026A	4960A20032A		
	359011	FAN ASM,CROSS FLOW	5901A10027A			
	349011	DAMPER ASM	4901A30002A			
	152302	FILTER(MECH),A/C	5230A20016A			
<b>E</b>	135312	GRILLE ASM,FRONT	3531A10149D			
	152302	FILTER(MECH),A/C	5230A20021A			
<b>F</b>	135515	COVER ASM, TOP	3551A20197P			
	753000	HEATER,ELECTRIC	5300A20006A			
	W50400	RUBBER	5040A30032A			
	546811	MOTOR ASM(OUTDOOR)	4681A20063E	4681A20063A		
	130411	BASE ASM,WELD	3041A20028B			
	135500	DRAIN COVER	3550A20102A			
	552206	DRAIN,VALVE	5220A30006A			
	349600	MOUNT,MOTOR	4960A20005A			
	149980	SHROUD	4998A20001B			
	559010	FAN ASM,AXIAL	5900AR1173A			
	W48602	CLAMP,SPRING	3H02932B			
	148000	BRACE	4800A20002A			
	354210	EVAPORATOR ASM	5421A20118A	5421A20118C	5421A20118A	
	554030	CONDENSER ASM	5403A20091D	5403A20076B	5403A20091D	

