

# PACKAGED TERMINAL AIR CONDITIONER /HEAT PUMP TECH SHEET

**CAUTION** Disconnect from Electrical Supply Before Servicing Unit

## Electrical Requirements

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 is still energized.
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.

### 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.

## Self-Diagnosis

### FUNCTION:

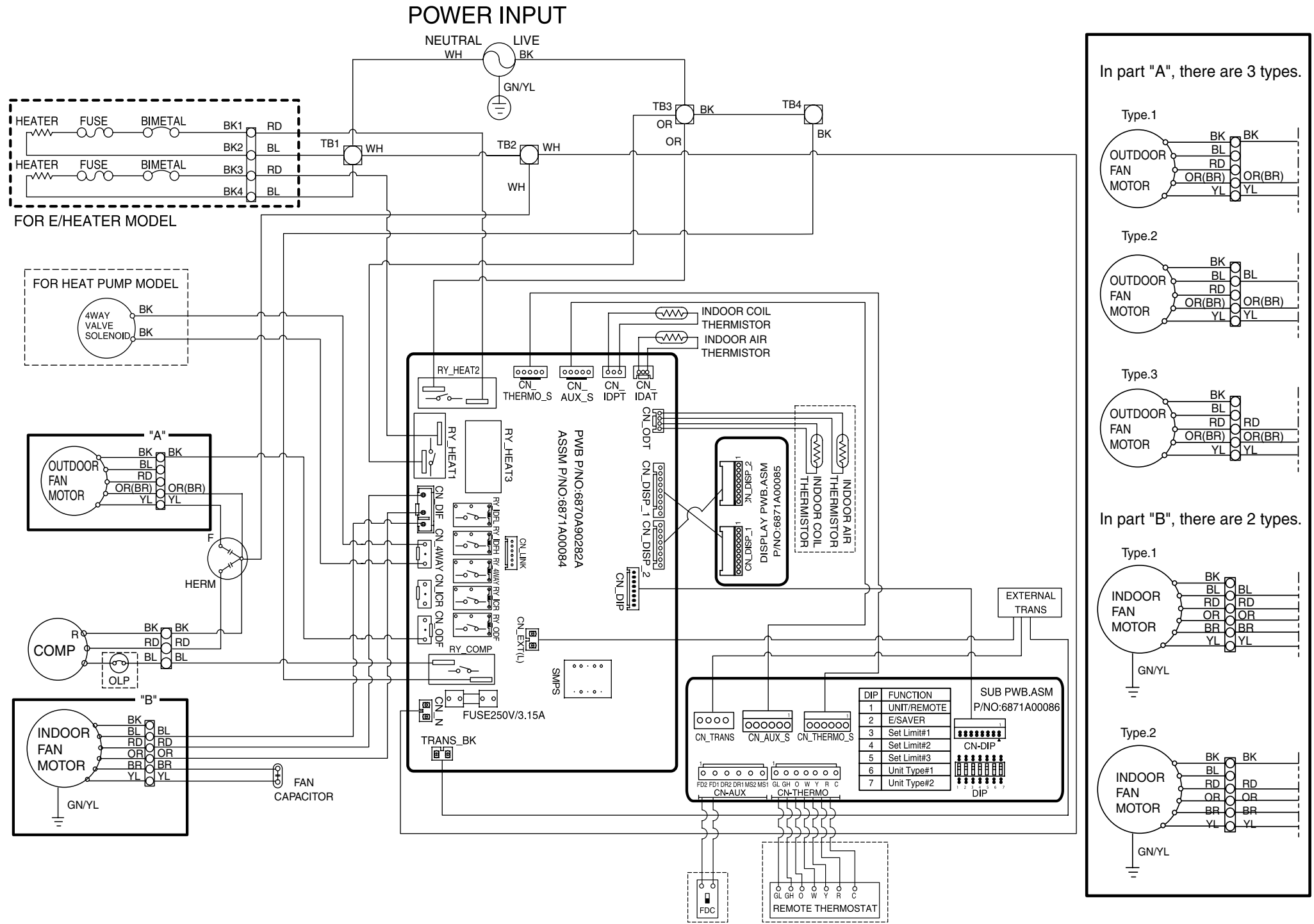
If the unit has a malfunction, a green OPERATION LED located on the Display PCB used by the unit to indicate the errors.

### USE:

If the customer has to register a complaint to the service center, he can be very clear about registering the complaint that what is happening & by referring the user's manual the customer can clearly define the problem. So that the engineer should go fully prepared with the prescribed tools to be used regarding that problem. It also keeps the customer aware about the unit. Here are some of the problems defined below for which the LED indicates by flashing number of times the error has been recorded against it. The errors are the mentioned which is as follows:

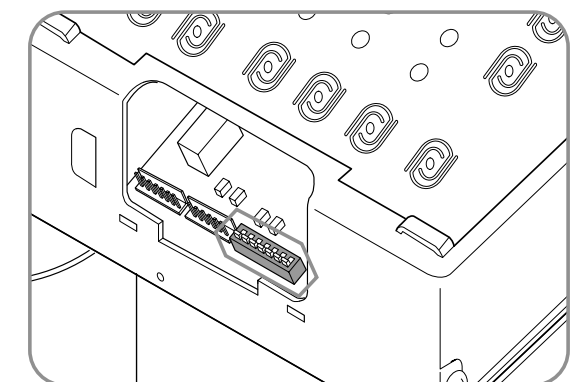
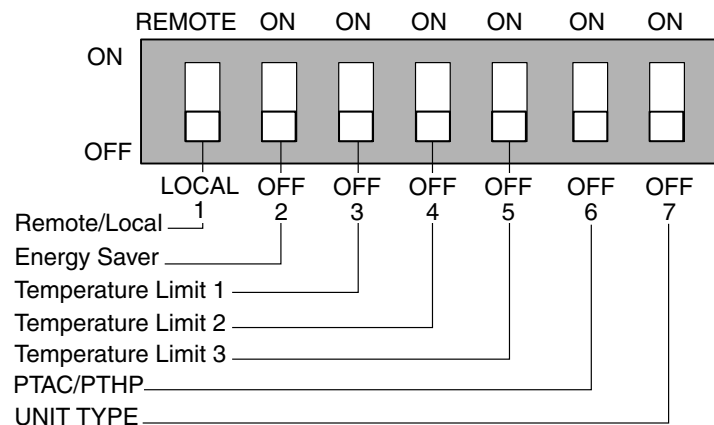
ON	Normal
OFF	No power / failed board
Fault Codes	
CH 01	Indoor Air Thermistor Error
CH 02	Indoor Coil Thermistor Error
CH 03	Outdoor Air Thermistor Error (PIHP Only)
CH 04	Outdoor Coil Thermistor Error (PIHP Only)
CH 05	Mode Error
CH 06	Setpoint Error
CH 07	Bad Thermistor Wiring

## Schematic Diagram



## 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 servicer 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 switches #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)

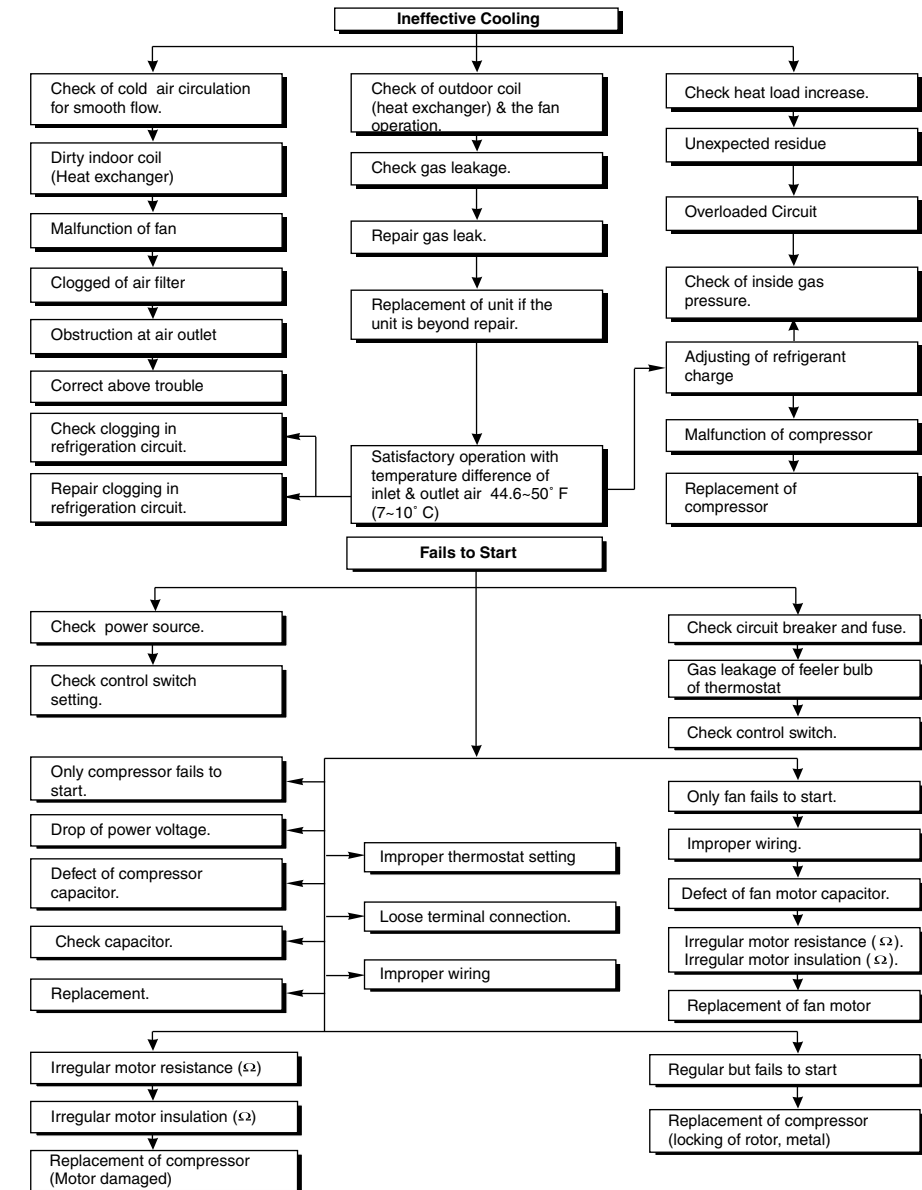
#6	#7	Unit Type
OFF	OFF	Cooling+Electric Heater+Heat Pump
OFF	ON	Cooling+Electric Heater
ON	OFF	Heat Pump Only
ON	ON	Cooling Only

# Troubleshooting Guide

In general, possible trouble is classified in two causes.

The one is 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



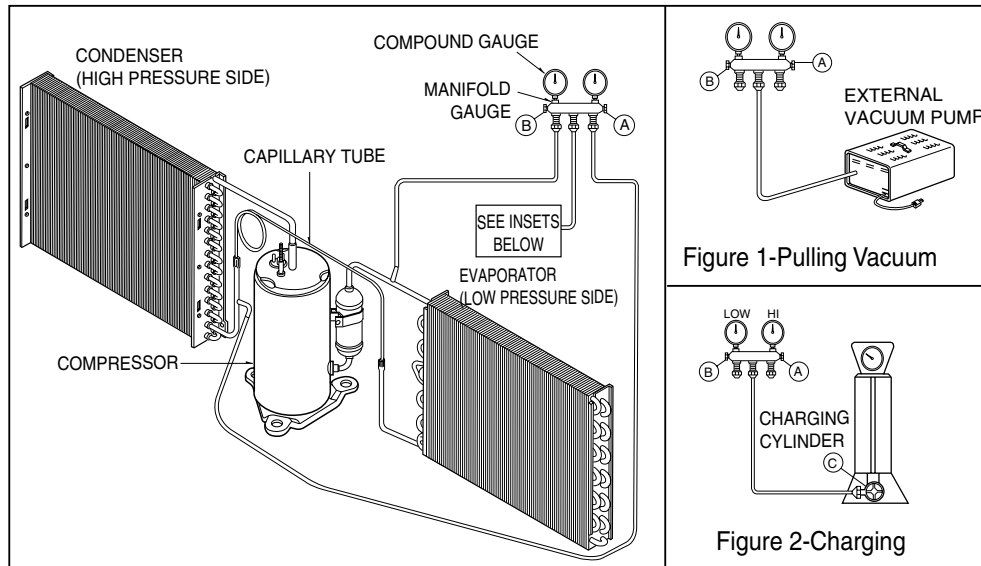
## — Replacement of the refrigeration cycle.

- When replacing the refrigeration cycle, be sure to discharge the refrigerant system using a refrigerant recovery system.
  - If there is no valve to attach the recovery system, install one (such as a WATCO A-1) before venting the refrigerant. Leave the valve in place after servicing the system.
- After discharging the unit completely, remove the desired component, and unbraid the pinch-off tubes.
- Solder service valves into the pinch-off tube ports, leaving the valves open.
- Solder the pinch-off tubes with service valves.
- Evacuate as follows.
  - Connect the vacuum pump, as illustrated Figure 1.
  - 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.

- Operate the vacuum pump for 20 to 30 minutes, until 600 microns of vacuum are obtained. Close valves A and B, and observe the 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.
  - Remove the hose from the vacuum pump and place it on the charging cylinder. See Figure 2. Open valve C. Discharge the line at the manifold connection.
  - The system is now ready for final charging.
- Recharge as follows :
    - 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.
    - Connect the charging cylinder as shown in Figure 2. With valve C open, discharge the hose at the manifold connection.
    - Open valve A and allow the proper charge to enter the system. Valve B is still closed.
    - If more charge is required, the high-side will not take it. Close valve A.
    - With the unit running, open valve B and add the balance of the charge.
      - Do not add the liquid refrigerant to the low-side.
      - Watch the low-side gauge; allow pressure to rise to 30 lbs.
      - Turn off valve B and allow pressure to drop.
      - Repeat steps B and C until the balance of the charge is in the system.
    - 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.



COMPLAINT	CAUSE	REMEDY
Fan motor will not run. < Indoor motor > 	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 ±10% of manufacturer's rating. Replace if shorted, open, or damaged.
< Outdoor motor > 	Will not rotate	Fan blade hitting shroud or cross flow fan hitting scroll. Realign assembly.  Units using slinger ring condenser fans must have 1/4 to 5/16 inch clearance to the base. If it is hitting the base, shim up the bottom of the fan motor with mounting screw(s).  Check fan motor bearings; if motor shaft will not rotate, replace the motor.
	Fan motor runs intermittently	Revolves on overload. Check voltage. See limits on this page. If not within limits, call an electrician.  Test capacitor. Check bearings. Does the fan blade rotate freely? If not, replace fan motor.  Pay attention to any change from high speed to low speed. If the speed does not change, replace the motor.
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.

COMPLAINT	CAUSE	REMEDY
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	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 ±10% of manufacturer's rating. Replace if shorted, open, or damaged.
Compressor	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

NAME PLATE RATING	MINIMUM	MAXIMUM
208/230V	187V	252V