

SERVICE MANUAL

# MOBILE SERIES

AMC-14P



“Original instructions”

**IMPORTANT NOTE:**

Read this manual carefully before installing or operating your new air conditioning unit. Make sure to save this manual for future reference.

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## 1 Safety precaution

### 1.1 Installation

For electrical work, contact the dealer, seller, a qualified electrician, or an Authorized service center.

Do not disassemble or repair the product by yourself.

Sharp edges could cause injury, be especially careful of the case edges and the fins on the condenser and evaporator.

Be sure the installation area does not deteriorate with age.

Take care to ensure that power cable could not be pulled out or damaged during operation.

Do not place anything on the power cable.

Do not plug or unplug the power supply plug during operation.

Do not store or use flammable gas or combustible near the product.

When flammable gas leaks, turn off the gas and open a window for ventilation before turn the product on.

If strange sounds, or small or smoke comes from product. Turn the breaker off or disconnect the power supply cable as soon as possible.

When the product is soaked (flooded or submerged), contact an Authorized service center.

Be caution that water could not enter the product.

Turn the main power off when cleaning or maintaining the product.

When the product is not be used for a long time, disconnect the power supply plug or turn off the breaker.

### 1.2 Caution

Always check for gas (refrigerant) leakage after installation or repair of product.

Install the drain hose to ensure that water is drained away properly.

Keep level even when installing the product.

Do not install the product where the noise or hot air for the outdoor could damage the neighborhoods.

Use two or more people to lift and transport the product.

Do not install the product where it will be exposed to sea wind (salt spray) directly.

### 1.3 Operational

Do not expose the skin directly to cool air for long periods of time. (Do not sit in the draft). Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigerant system.

Do not block the inlet or outlet of air flow.

Use a soft cloth to clean. Do not use harsh detergents, solvents, etc.

Do not touch the metal parts of the product when removing the air filter. They are very sharp.

Do not step on or put anything on the product.

Always insert the filter securely. Clean the filter every two weeks or more often if necessary.

Do not insert hands or other object through air inlet or outlet while the product is operated.

Do not drink the water drained from the product.

Replace the all batteries in the remote control with new ones of the same type. Do not mix old and new batteries or different types of batteries.

Do not recharge or disassemble the batteries. Do not dispose of batteries in a fire.

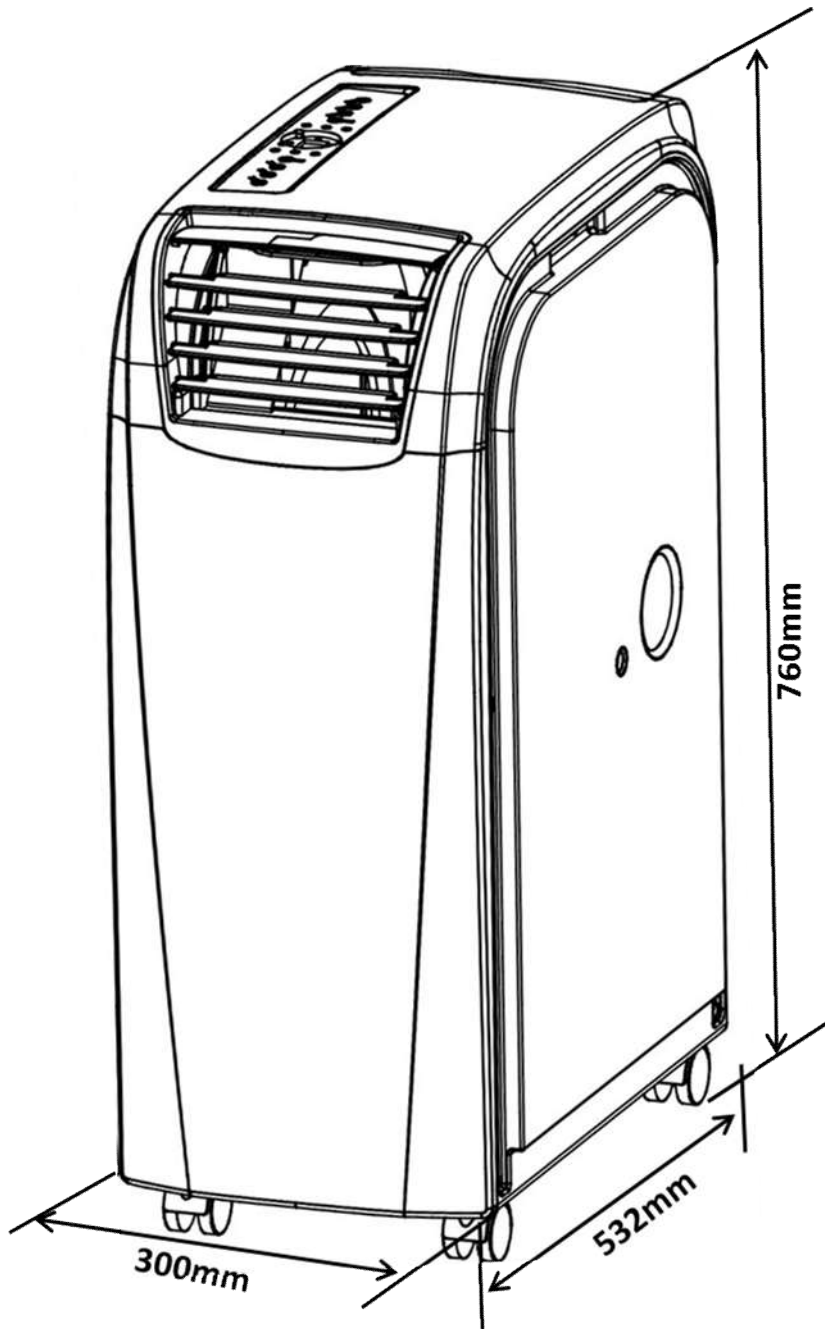
If the liquid from the batteries gets onto your skin or clothes, wash it well with clean water. Do not use the remote if the batteries have leaked.

## 2 Specification

Model		AMC-14P	
Nameplate marking		SINCLAIR	
Power supply	Ph-V-Hz	1 $\phi$ ,220V~240V,50Hz	
Cooling Capacity	W	4000	
Cooling Power consumption	W	1535	
Heating Power consumption	W	1290	
Cooling Rated current	A	6.5	
Cooling SCE	W/W	2.58	
<b>System data</b>			
Refrigerant type	g	R290/270g	
Operation pressure	Mpa	4.0	
Moisture Removal(30°C,RH80%)	L/DAY	70	
Indoor air flow (Hi/Mi/Lo)	m <sup>3</sup> /h	450/380/350	
Noise level (Hi/Mi/Lo)	dB(A)	56/53/50	
<b>Dimension&amp;Weight</b>			
Dimension (WxHxD)	mm	300x532x760	
Packing (WxHxD)	mm	370x620x855	
Net/Gross weight	kg	30.6/34.2	
<b>System Details</b>			
Compressor Model		瑞智 44P273KH8	
Type		Rotary	
Capacity	W	3235W $\pm$ 5%	
Input	W	1015W $\pm$ 5%	
Rated current(RLA)	A	4.8A $\pm$ 5%	
Locked rotor Amp(LRA)	A	24.4A $\pm$ 5%	
Thermal protector		HPA-121	
Capacitor		50uF 450VAC	
Refrigerant oil	CC	240	
Fan Motor		Inner Motor	Outer Motor
Model		720352-0Y-3-AL	720350-0Y-3-AL
Input	W	85/80/75	130
Capacitor		2.5uF	3.5uF
Speed(hi/mi/lo) $\pm$ 50	Rpm	1100/1000/900	1300
<b>Evaporator</b>			
Number of rows		3	
Tube pitch(a)x row pitch(b)	mm	21x11.6	
Fin spacing	FPI	20	
Fin type (code)		Hydrophilic aluminum	
tude outside dimension type		$\Phi$ 7 inner groove tube	
axial length x height x width	mm	298x273x38.1mm	
Number of circuits		2	
<b>Condenser</b>			
Number of rows		4	
Tube pitch(a)x row pitch(b)	mm	11.95x11.6	
Fin	FPI	20	
Fin type (code)		aluminum	
tude outside dimension type	mm	$\Phi$ 5 inner groove tube	
axial length x height x width	mm	348.6x332.8x58.4mm	
Number of circuits		1	

The test condition is 35°C db/24°C

3 Out dimension

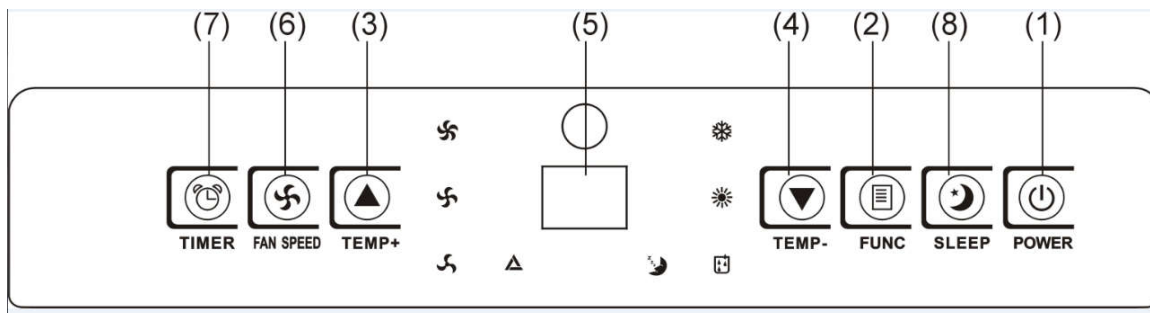




## 4 Display

### 4.1 LED display

#### LED DISPLAY PANEL MODELS:



#### 1. POWER

Press this button to switch the unit on or off

#### 2. FUNCTION

Press this button to select between Cooling () , Heating () or Dehumidifying () mode

#### 3. TEMP+

- Pressing this button in cooling mode adjusts the required room temperature by 1°C up to a maximum temperature of 30°C.
- Pressing this button in heating mode adjusts the required room temperature by 1°C up to a maximum temperature of 25°C.

#### 4. TEMP-

- Pressing this button in cooling mode adjusts the required room temperature by 1°C to a minimum temperature of 17°C.
- Pressing this button in heating function adjusts the required room temperature by 1°C to a minimum temperature of 15°C

#### 5. LED-DISPLAY




The display shows the current ambient temperature in operation.

By pressing the [TEMP+] or [TEMP-] buttons, the required target temperature is displayed.

When pressing the timer button [TIMER], the number of hours is shown until delayed start up or delayed shutdown. After each setting, the display automatically shows the current ambient temperature again. In the dehumidifying mode, “dH” (or “HP” upside-down) is shown on the display.

Error messages are also shown in the display.

#### 6. SPEED

Pressing this button sets the ventilation speed to “ (low)”, “ (medium)”, “ (high)” or “AUTO (Automatic)”. If “AUTO” is selected, the ventilator operates at temperature differences larger than 9 degrees at top speed. If the temperature reduces to a difference smaller than 4 degrees, the ventilator switches to middle blower position. If the temperature reduces further until the target temperature, the ventilator switches to the lowest blower position.


## 7. TIMER

Programmable timer button for delayed start up or delayed shutdown

### How to program a delayed start up

This function is used to set the number of hours delay before the appliance comes on. Proceed as follows:


- Press [TIMER] button **in Stand-by mode** (unit is plugged in but not in operation, no display on the panel), to set the number of hours delay before the appliance comes on.
- Select the required function (cooling, heating, and dehumidification), wait until the unit displays the ambient temperature, and then set the desired temperature.
- After the set number of hours has expired, the unit starts automatically.

If you press the [POWER]  button before the time has expired, the delayed start up will be cancelled, the unit turns on and can be operated in the required operating mode.

### How to program a delayed shutdown

This function is used to set the number of hours delay before the appliance goes off. Proceed as follows:

- Start the unit in required function (cooling, heating or dehumidifying)
- Press the [TIMER] button **during operation** and enter the required number of hours delay before the appliance goes off.
- After the flashing of the number of hours on the LED has stopped, can select the required temperature.
- After the set number of hours has expired, the unit shuts down automatically.

If you press the [POWER]  button before the time has expired, the unit shuts down.

## 8. SLEEP

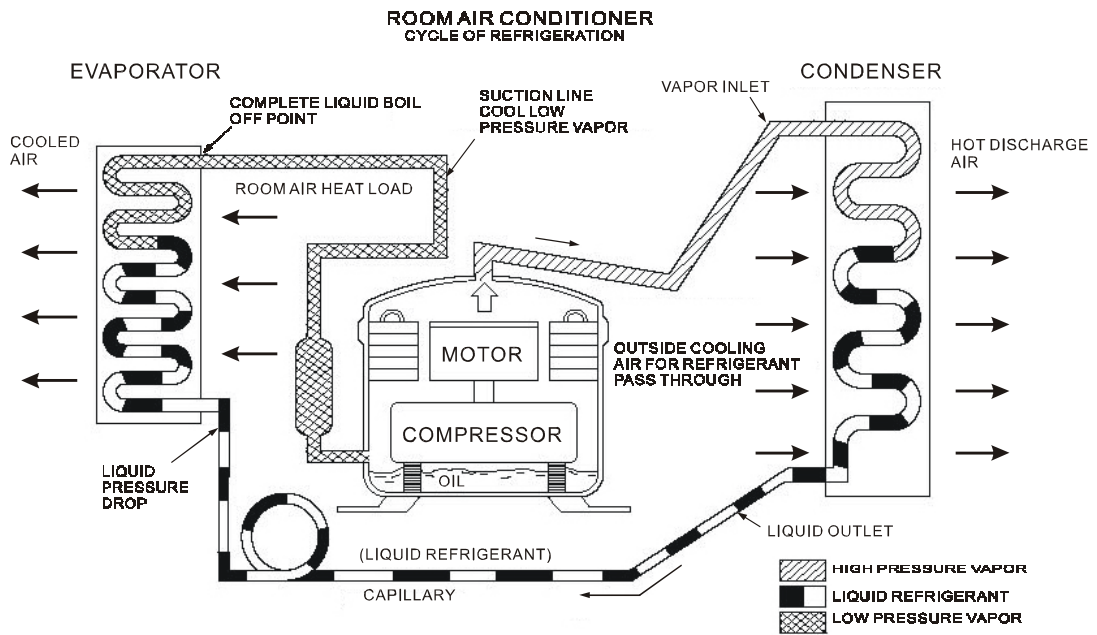
This function is ideal for the night as it gradually reduces operation of the appliance. The sleep function maintains the room at optimum temperature and with silent operation.

When you use the sleep function, first set the timer as described in the functions.

Delayed start and delayed shutdown: Press the [TIMER] button until the required hours appear on the display. After the hour display, the display switches automatically to the previous set temperature display. To change the temperature, press the [TEMP+] or [TEMP-] buttons. With each press on the button, the temperature increases or decreases by 1°C.

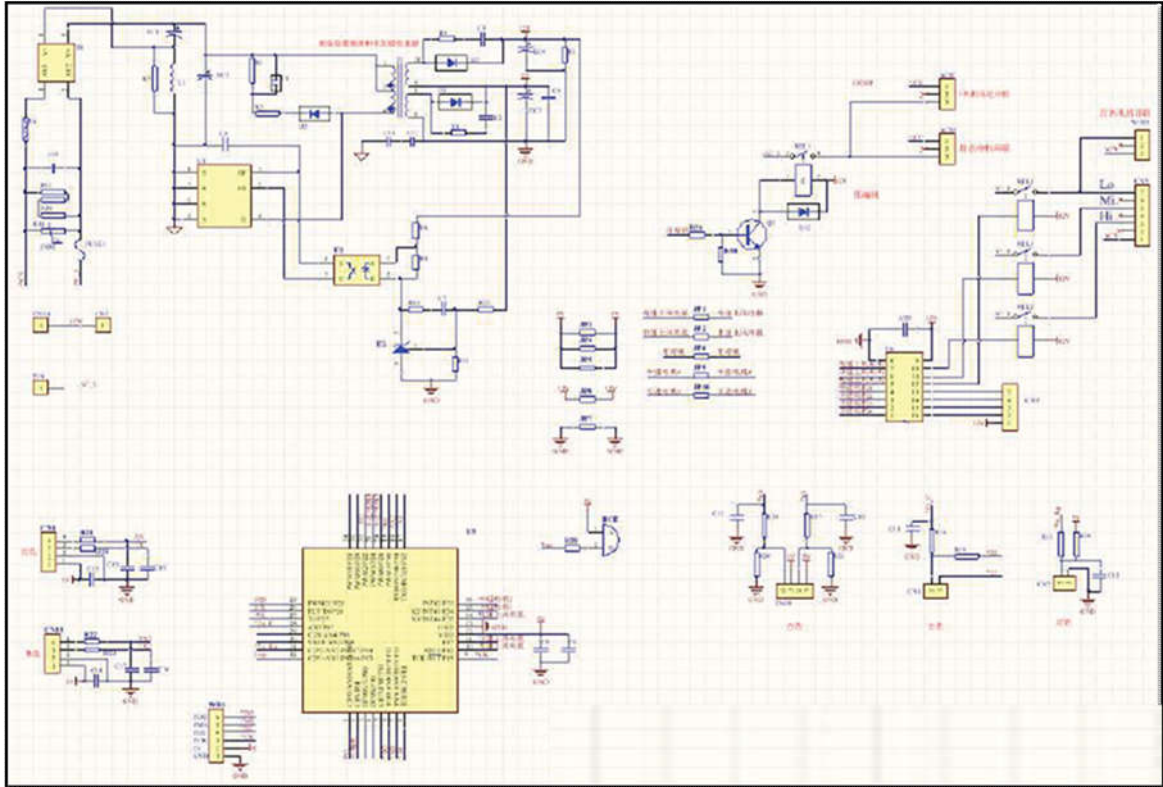
## 5 Refrigerant cycle diagram

The figure below is a brief description of the important components and their function in what is called the refrigeration system

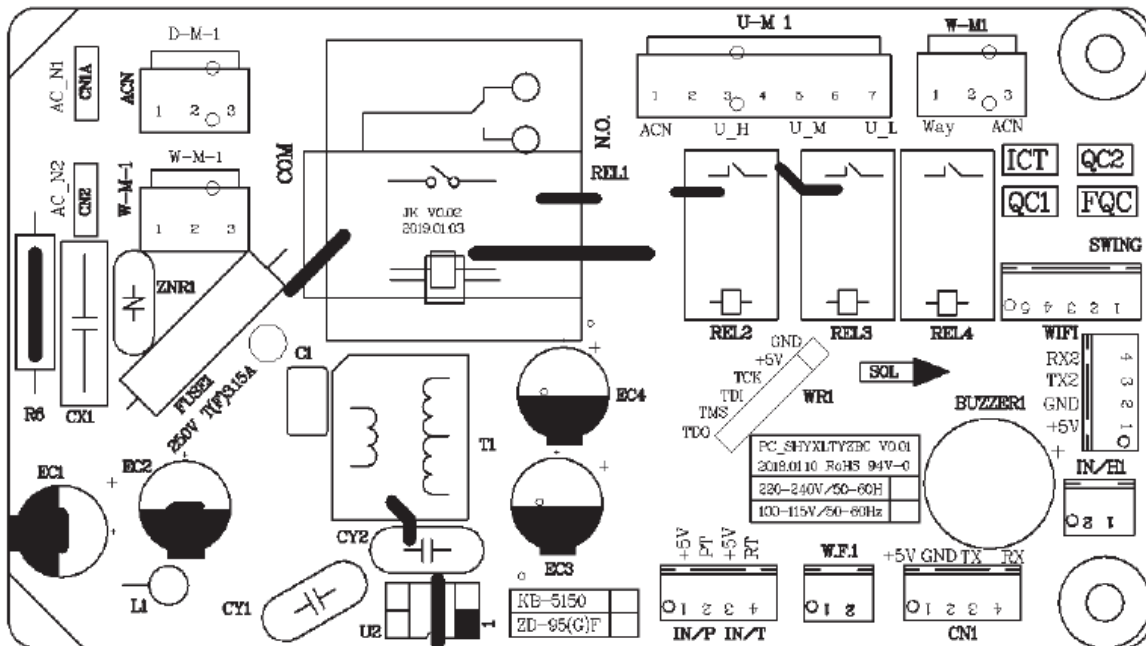


## 6 PCB drawing & wiring diagram

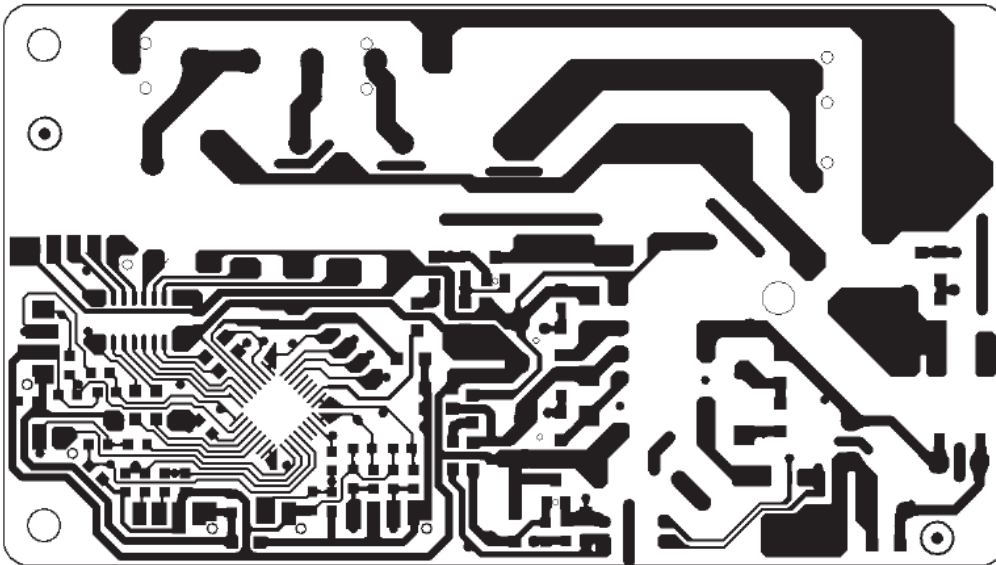
The below picture is PCB schematic:  
800510-0Y-A-1-JK



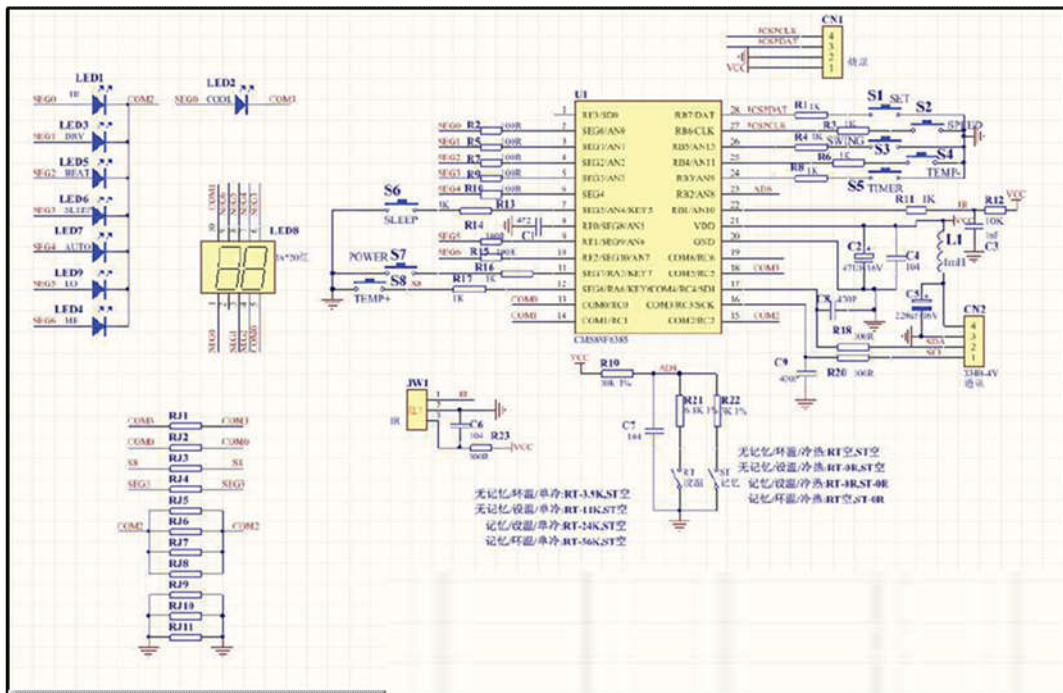
The below picture is PCB Drawing  
800510-0Y-A-1-JK



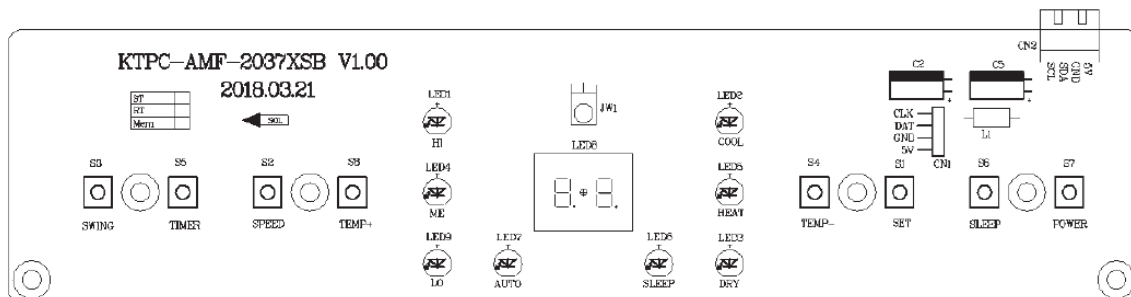
The below picture is PCB Layout:  
800510-0Y-A-1-JK



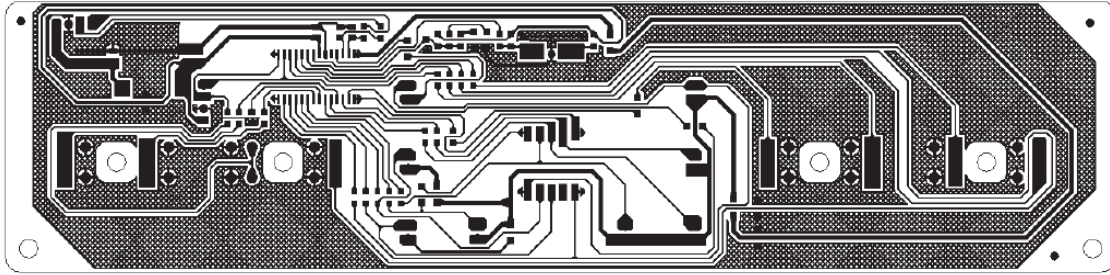
The below picture is Display schematic:  
800272-0Y-1-MSK-JK



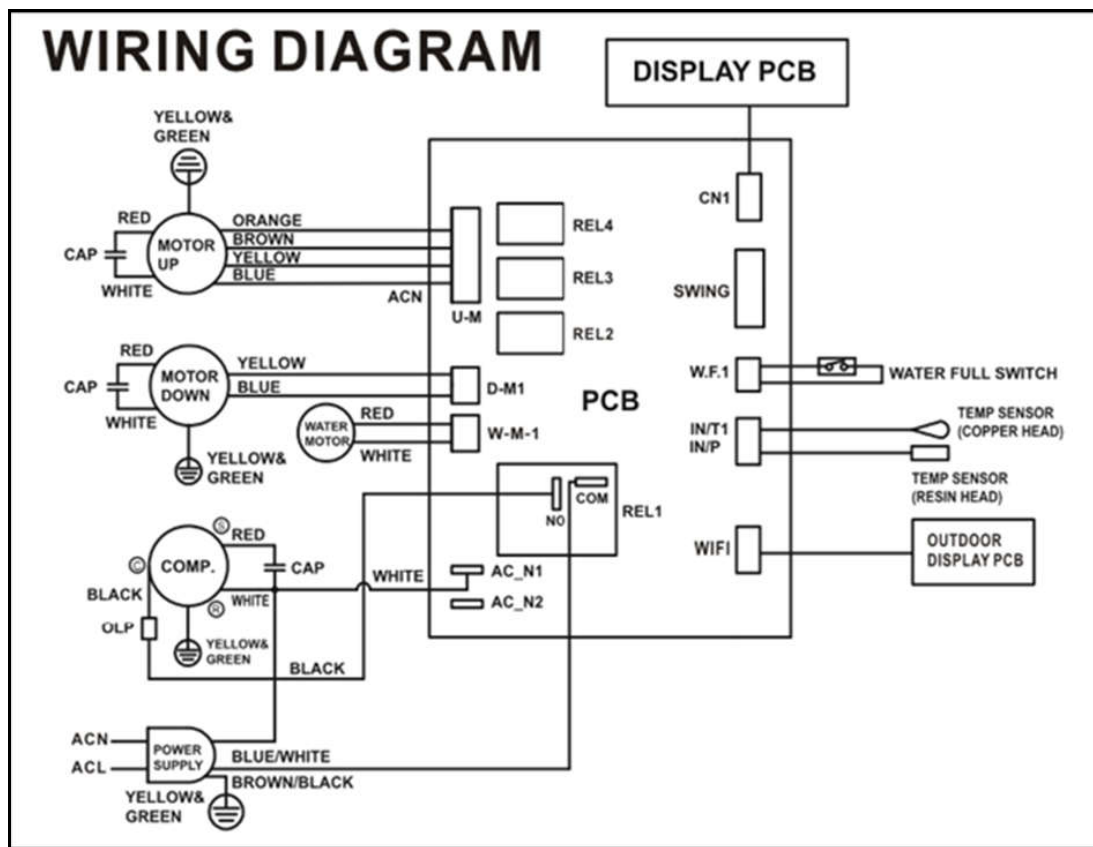
The below picture is Display Drawing:  
800272-0Y-1-MSK-JK



The below picture is Display Layout:  
800272-0Y-1-MSK-JK



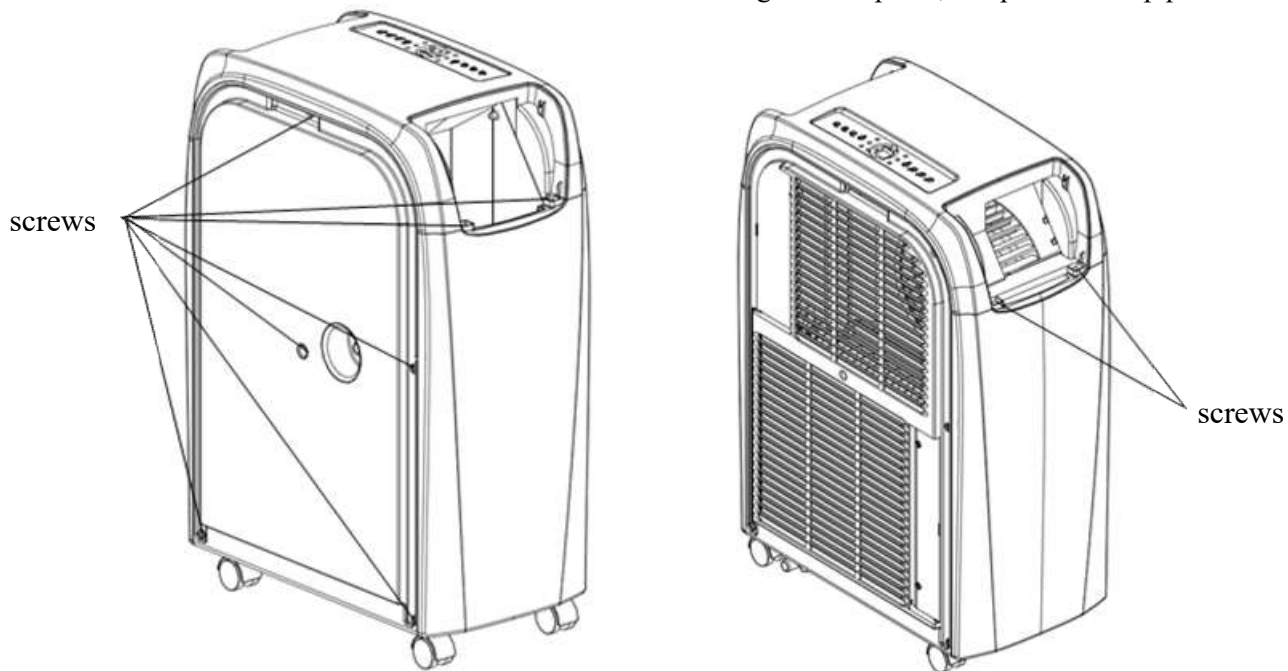
Wiging Diagram



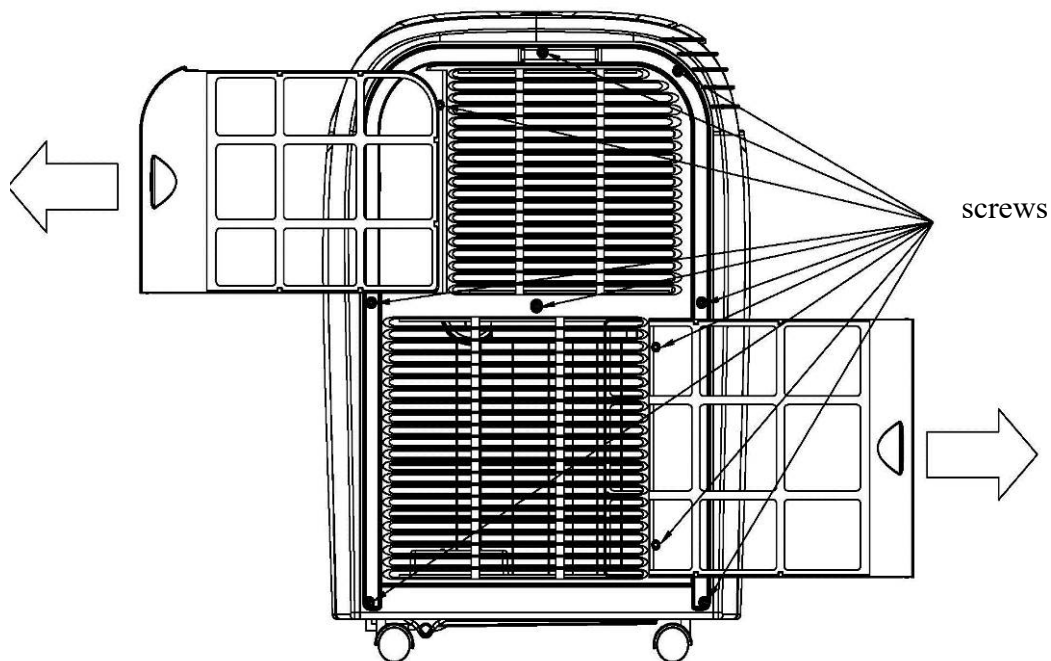
## 7 Unit Disassembly sequence

### 7.1 Step1 Casing Disassembly

disassemble hot and cool air louver and unscrew the casing of front panel,side panel and top panel



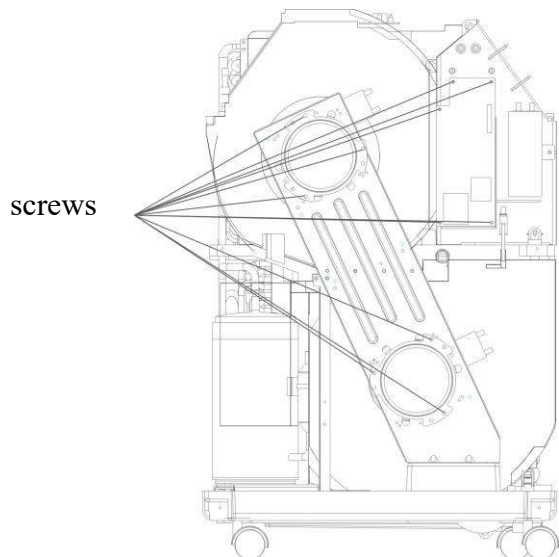
disassemble Filter and unscrew



## 7.2 Step2 Internal Parts Disassembly

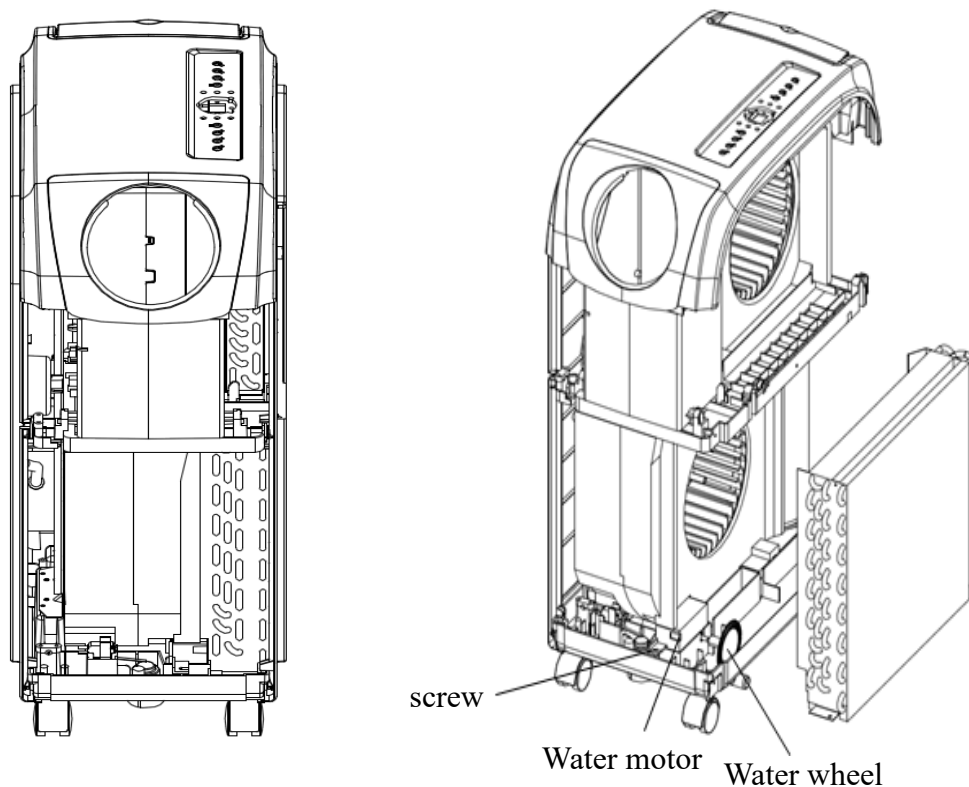
Motor and PCB Disassembly :

please also dismantle the screws at two sides,for the right side is the fasten strip



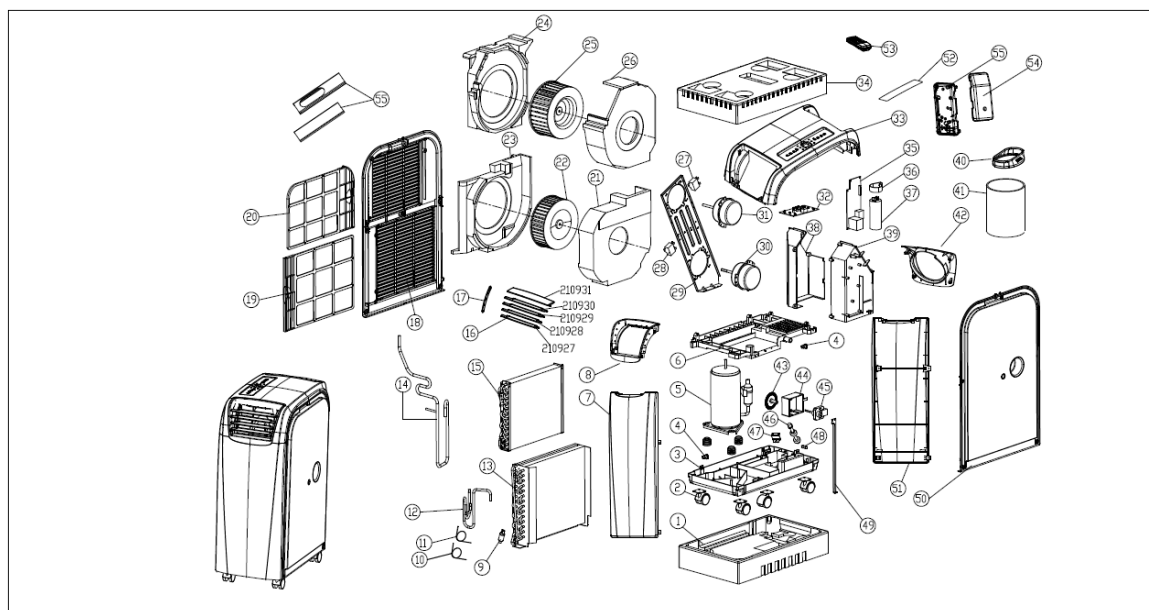
Disassembly steps for water motor :

please dismantle the screws of condensor,slide up the partition panel.and then slow take out the condensor from the left hand side.From there, you can see the water motor.Caution, please be note that in order to avoid any water split by water wheel, you should uphold the condensor





## 8 Exploded



ITEM	PART NO.	PART NAME		Q
1	410720-0Y-1	PACKING BOTTOM PSF	EA	1
2	290025-00XY-H	WHEEL TWP	EA	4
3	210523-LY-6	BASE	EA	1
4	310025-0Y-1	RUBBER STOPPER	EA	2
5	700425-0Y-3	COMP, 4P273KH8	EA	1
6	210524-HY-1-H	PARTITION	EA	1
7	211010-0Y-1-9	FRONT PANEL	EA	2
8	210923-CY-1	OUTLET FOR COOLD AIR	EA	1
9	740007-0Y-15	STRAINER	EA	1
10	781000-0Y-6-4	CAPILLARY 1.0x2.2xL600	EA	1
11	781000-0Y-6-6	CAPILLARY 1.0x2.2xL700	EA	1
12	780709-0Y-1	DISCHARGE TUBE	EA	1
13	710406-0Y-1	CONDENSER	EA	1
14	780708-0Y-1	SUCTION TUBE	EA	1
15	710405-0Y-1	EVAPORATOR	EA	1
16	210927/28/29/30/31-AY-2	horizontal blade	EA	4
17	210932-AY-2	Join for horizontal blade	EA	1
18	210527-CY-2-H	LEFT SIDE PLATE	EA	1
19	210533-AY-2-H	COND FILTER	EA	1
20	210532-AY-2-H	EVA FILTER	EA	1
21	410331-0Y-1	HOUSING BLOWER, RIGHT BOTTOM	EA	1

22	210631-0Y-6	WHEEL BLOWER $\phi$ 215x95 ABS+GF	EA	1
23	410330-0Y-1	HOUSING BLOWER, LEFT BOTTOM	EA	1
24	410635-0Y-1	HOUSING BLOWER, LEFT TOP	EA	1
25	210631-0Y-1	WHEEL BLOWER $\phi$ 215x95 ABS	EA	1
26	410634-0Y-1	HOUSING BLOWER, RIGHT TOP	EA	1
27	730008-BY-1	CAP, 2.5uFx450VAC	EA	1
28	730052-BY-1	CAP, 3.5uF 450V	EA	1
29	110276-AY-1	MOTOR BRACKET	EA	1
30	720350-0Y-3-AL-N	OUTER MOTOR	EA	1
31	720352-0Y-3-AL-LZ	INNER MOTOR	EA	1
32	800272-0Y-1-MSK-JK	DISPLAY PCB	EA	1
33	211009-BY-1	CONTROL PANEL	EA	1
34	410719-0Y-1	PACKING TOP PSF	EA	1
35	800510-0Y-A-1-JK	MAIN PCB	EA	1
36	190004-0B4Y	Clip for capacitor	EA	1
37	730102-0Y-1-D	CAPACITOR, 35uF 450VAC	EA	1
38	212084-0Y-2	OUTLET FOR HOT AIR, RIGHT	EA	1
39	212083-0Y-2	OUTLET FOR HOT AIR, LEFT	EA	1
40	211238-0Y-1	PIPE OUTER LEFT , $\Phi$ 150mm	EA	1
40	211239-0Y-1	PIPE OUTER RIGHT, $\Phi$ 150mm	EA	1
41	290008-0Y-12	PIPE EXHAUST, $\phi$ 150mm	EA	1
42	210924-BY-1	OUTLET FOR HOT AIR	EA	1
43	210186-0BXY	WHEEL WATER	EA	1
44	210538-CY-1	COVER FOR WATER MOTOR	EA	1
45	720300-0Y-3-AL-N	WATER MOTOR , 230V/50Hz	EA	1
46	750036-0Y-6	SWITCH	EA	1
47	110500-0Y-2	SWITCH BRACKET	EA	1
48	210467-AY-3	wire holder-bottom	EA	1
49	110196-BY-1	MAIN BRACKET	EA	1
50	210526-FY-2-1-H	RIGHT SIDE PLATE	EA	1
51	211010-0Y-1-9	Back PANEL	EA	1
52	240003-0Y-15	CONTROL PLATE		1
53	800032-0Y-1-3	REMOTE CONTROLLER	EA	1
54	212152-0Y-1	COVER FOR MAIN PCB	EA	1
55	212151-0Y-1	BASE FOR MAIN PCB	EA	1
56	230084-0Y-1-Y	THE WINDON SCREEN COMBINATION	EA	1

## 9 Feature

### 9.1 Parts of the Air Conditioner

Remove the air conditioner from the packing carton. It is recommended to keep the carton and packing material for storage or transportation of the unit.

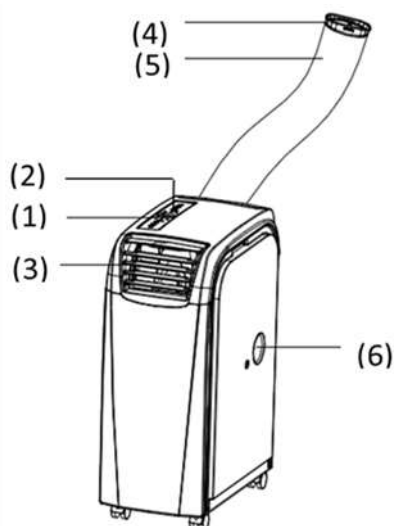


Figure 1

#### Front of Unit (Figure 1)

1. Control panel
2. Remote receiver
3. Adjustable air vent
4. Hose joint
5. Exhaust hose
6. Upper drain outlet

#### Rear of Unit (Figure 2)

7. Cool air inlet
8. Cool air filter
9. Warm air inlet
10. Warm air filter
11. Drain outlet

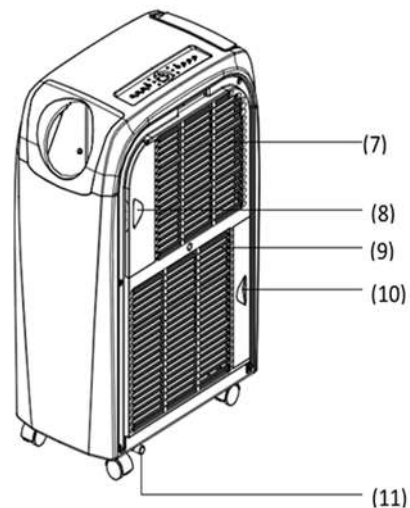


Figure 2

### 9.2 Accessories

- 1 x unit
- 1 x remote control
- 1 x air hose 150 cm
- 1 x air hose connector
- 1 x drainage hose 50 cm

- 1 x bracket air hose
- 1 x operating instructions

Upon unpacking the air conditioner, check to ensure these following accessories are included:



Hose



Drain hose  
For continuous  
drainage



Window slider kit



2 AAA batteries



Remote Control

## 10 Electronic function

### 10.1 Function

10.1.1 Cooling , Heating or Dehumidifying mode

10.1.2 With Auto switch on, off and sleep mode function

10.1.3 Ts range: Cooling: 17~30°C/65~90°F; Heating: 15~25°C/60~80°F;

Time delay safety control

10.1.4 With 3 fan speed mode available in high, medium, low for the upper fan system while for the lower fan system is only available with single speed. This single fan speed is working together with the compressor and can auto detect the any damages within

### 10.2 Controller Specifications

10.2.1 Normal power source: 220VAC±15% 或 110VAC±15%

10.2.2 Operation temperature for electrical system

working temperature range: -10°C~+60°C

storage temperature range: -20°C~+70°C

relative humidity range: 35~98%

10.2.3 temperature sensor: R25/50=5K、B=3470 temperature precision: ±1°C

10.2.4 display ambient temperature

10.2.5 For Fahrenheit switching, please press function key for 10 s during the stand by mode.

### 10.3 Controller Structure

The control systems are consist of remote control, internal control display, main PCB board, and internal receiver. While for internal PCB board output systems are consists of upper fan system (high, medium and low) and compressor

### 10.4 Sensor Definitions

TA: Temperature of ambient, (T1).

TE: Temperature of evaporator, (T2).

TS: Setting temperature, (T3).

### 10.5 Mode

10.5.1 Cooling

10.5.1.1 In cooling mode, set point temperature 17~30°C/60~90°F; starting temperature is 25°C (77°F)。

10.5.1.2 cooling mode compressor working condition:

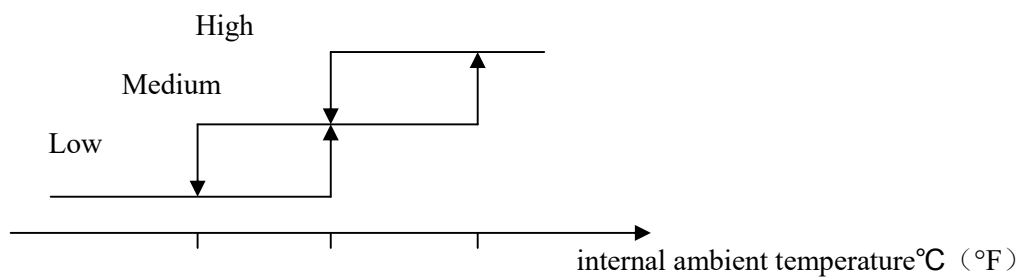
A: Under the condition of  $T1 \geq T + 1^{\circ}\text{C}$  ( $2^{\circ}\text{F}$ ) ,compressor will be running

B:Under the condition of  $T1 \leq T + 1^{\circ}\text{C}$  ( $2^{\circ}\text{F}$ ) ,the unit will be switched off,compressor will be off too

C:Under the condition of  $T1 \leq T + 1^{\circ}\text{C}$  ( $2^{\circ}\text{F}$ ) ,the compressor and internal motor system will be switching back to the original setting

Note: When compressor is off, cooling operation light is splashing(0.5second per time)When the compressor is running, the operation light will be turned on

10.5.1.3 During the cooling mode, the upper fan system can be set into auto,high,medium,low and auto fan mode



set point temperature 2 (3) 4 (6)

10.5.1.4 Cooling mode,lower fan system is working together with compressor

10.5.2 Dehumidification mode( DH display)

10.5.2.1Upper fan system is operated in low fan. Lower fan is working together with the compressor

10.5.2.2 Dehumidification mode.

A. Indoor temperature  $\leq 0^{\circ}\text{C}$ ,compressor will be off

B.  $0^{\circ}\text{C} < \text{indoor temperature} \leq 20^{\circ}\text{C}$ ,compressor will be on for 15 min and stop for 3 min

C. indoor temperature  $> 20^{\circ}\text{C}$ compressor will be on for 30 min and stop for 3 min

We only can check the indoor temperature after such operation finishes after every week,

Note: When compressor is stop, the dehumidification indication light is on.

10.5.3Heating mode

10.5.3.1Heating mode: set point temperature range is  $15 \sim 25^{\circ}\text{C}$  ( $60 \sim 80^{\circ}\text{F}$ ) ,starting temperature is  $20^{\circ}\text{C}$  ( $68^{\circ}\text{F}$ )

10.5.3.2 Heating mode, compressor working condition

A. Under the condition of  $T3 - T1 \geq +1^{\circ}\text{C}$  ( $2^{\circ}\text{F}$ ) compressor will be turned on

- B. Under the condition of  $T3-T1 \leq -1^{\circ}\text{C}$  ( $2^{\circ}\text{F}$ ) compressor will be turned off
- C. Under the condition of  $T1=T3-1^{\circ}\text{C}$  ( $2^{\circ}\text{F}$ ) compressor will be operated under the original setting mode

Note: Under the condition of compressor off. Heating light is splashing (0.5second per time) compressor will be running and heating indication light will be turned on.

10.5.4 Heating mode, upper fan system is operated in high speed without setting. Lower fan system is working together with compressor

## 10.6 Timer Setting

10.6.1 Tiner setting can be set 1-24 hours

10.6.2 During the unit operation, you can set numbers of hours. The unit will be auto switch off .While the unit will be auto switch on if the unit is set in auto mode

## 10.7 Sleep

10.7.1 To set the sleep mode under the cooling setting, To increase this setting press the "UP" button and for each press, the temperature will be increased by  $1^{\circ}\text{C}$ , continually, the temperature will be rise up to  $2^{\circ}\text{C}$  after the 2 hours operation. Apart from this, the temperature will not be rise up anymore.

10.7.2 To set the sleep mode under the heating setting, To increase this setting press the "down" button and for each press, the temperature will be decreased by  $1^{\circ}\text{C}$ , continually, the temperature will be decrease to  $2^{\circ}\text{C}$  after the 2 hours operation. Apart from this, the temperature will not be rise up anymore.

10.7.3 It is confirmed that there is no sleep mode function during the dehumidification function

10.7.4 Under this sleep mode, the fan speed remained as low speed

## 10.8 Protection function

10.8.1 Compressor delay protection

10.8.1.1 When the unit is in operation, compressor need 3 min and 30s for starting

10.8.1.2 When compressor is off and restart again, restarting period is 3 min and 30s

10.8.2 Defrosting protection mode( display DF)

Compressor keep on working for 15 min. please check the fan coil temperature  $\leq 1^{\circ}\text{C}$ . thus compressor will be turned off. if the compressor stop for 3 min & 30s. Indoor fan coil temperature  $> 2^{\circ}\text{C}$  compressor will be turned on and defrosting mode will be off

10.8.3 Water full protection (display E4)

When the water power is closed for 3 seconds, followed by water full protection, control

system will be off. All the power will be off. Signal will be turn into E4. If the water full signal is off., the control system has to be pressed on or off to restart the operation

10.8.4 E1:indicate the indoor temperature hot and resistance is in error thus control system will be off.

10.8.5 E2:indicate the indoor temperature hot and resistance is in error thus control system will be off.

10.8.6 Refrigerent leaking protection display as E3

Compressor turn on, if the tolerance is  $\leq 5^{\circ}\text{C}$  at between indoor temperature and fan coil after operation for 15 min.The compressor will be turn off, and upper fan system will be running at the set speed.The signal display E3 and press the power key or power off to clear this signal.

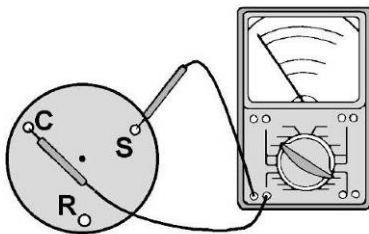
## 11 Basic test procedure

### 11.1 Defective compressor

Compressors are single phase, 115 or 120 volt, depending on the model unit. All compressor motors are permanent split capacitor type using only a running capacitor across the start and run terminal.

All compressors are internally spring mounted and externally mounted on rubber isolators.

#### 11.1.1 Compressor wiring test

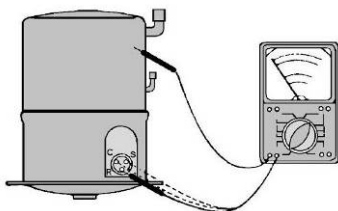


Remove compressor terminal box cover and disconnect wires from terminals. Using an ohmmeter, check continuity across the following:

- Terminal "C" and "S" - no continuity
- Open winding - replace compressor.
- Terminal "C" and "R" - no continuity
- Open winding - replace compressor.
- Terminal "R" and "S" - no continuity
- Open winding - replace compressor.

#### 11.1.2 Ground test

Use an ohmmeter set on its highest scale. Touch one lead to the compressor body (clean point of contact as a good connection is a must) and the other probe in turn to each compressor terminal (see Figure 2.) If a reading is obtained, the compressor is grounded and must be replaced.



#### 11.1.3 Checking the compressor efficiency

The reason for compressor inefficiency is normally due to broken or damaged suction and/or discharge valves, reducing the ability of the compressor to pump refrigerant gas.

This condition can be checked as follows:

1. Install a piercing valve on the suction and discharge or liquid process tube.
2. Attach gauges to the high and low sides of the system.
3. Start the system and run a "cooling or heating performance test."



If test shows:

- A. Below normal high side pressure.
- B. Above normal low side pressure.
- C. Low temperature difference across coil.

The compressor valves are faulty - replace the compressor.

#### 11.1.4 Terminal overload (external)

Some compressors are equipped with an external overload which is located in the compressor terminal box adjacent to the compressor body. The overload is wired in series with the common motor terminal. The overload senses both major amperage and compressor temperature. High motor temperature or amperage heats the disc causing it to open and break the circuit to the common motor terminal.

Heat generated within the compressor shell is usually due to:

- 1. High amperage.
- 2. Low refrigerant charge.
- 3. Frequent recycling.
- 4. Dirty condenser.

#### 11.1.5 Terminal overload (internal)

Some model compressors are equipped with an internal overload. The overload is embedded in the motor windings to sense the winding temperature and/or current draw. The overload is connected in series with the common motor terminal.

Should the internal temperature and/or current draw become excessive; the contacts in the overload will open, turning off the compressor? The overload will automatically reset, but may require several hours before the heat is dissipated.

#### 11.1.6 Checking the internal overload

- 1. With no power to unit, remove the leads from the compressor terminals.
- 2. Using an ohmmeter, test continuity between terminals C-S and C-R. If not continuous, the compressor overload is open and the compressor must be replaced.

## **11.2 Sealed refrigeration system repairs**

### 11.2.1 Equipment require

- 1. Voltmeter
- 2. Ammeter
- 3. Ohmmeter
- 4. E.P.A. Approved Refrigerant Recovery System.

5. Vacuum Pump (capable of 200 microns or less vacuum.)
6. Acetylene Welder
7. Electronic Halogen Leak Detector (G.E. Type H-6 or equivalent.)
8. Accurate refrigerant charge measuring device such as:
  - a. Balance Scales - 1/2 oz. accuracy
  - b. Charging Board - 1/2 oz. accuracy
9. High Pressure Gauge - (0 - 400 lbs.)
10. Low Pressure Gauge - (30 - 150 lbs.)
11. Vacuum Gauge - (0 - 1000 microns)

11.2.2 Equipment must be capable of:

1. Recovery CFC's as low as 5%.
2. Evacuation from both the high side and low side of the system simultaneously.
3. Introducing refrigerant charge into high side of the system.
4. Accurately weighing the refrigerant charge actually introduced into the system.
5. Facilities for flowing nitrogen through refrigeration tubing during all brazing processes.

11.2.3 Hermetic compressor replacement.

The following procedure applies when replacing components in the sealed refrigeration circuit or repairing refrigerant leaks. (Include Compressor, condenser, evaporator, capillary tube, refrigerant leaks, etc.)

1. Recover the refrigerant from the system at the process tube located on the high side of the system by installing a line tap on the process tube. Apply gauge from process tube to EPA approved gauges from process tube to EPA approved recovery system. Recover CFCs in system to at least 5%.
2. Cut the process tube below pinch off on the suction side of the compressor.
3. Connect the line from the nitrogen tank to the suction process tube.
4. Drift dry nitrogen through the system and unsolder the more distant connection first. (Filter drier, high side process tube, etc.)
5. Replace inoperative component, and always install a new filter drier. Drift dry nitrogen through the system when making these connections.
6. Pressurize system to 30 PSIG with proper refrigerant and boost refrigerant pressure to 150 PSIG with dry nitrogen.
7. Leak test complete system with electric halogen leak detector, correcting any leaks found.
8. Reduce the system to zero gauge pressure.
9. Connect vacuum pump to high side and low side of system with deep vacuum hoses, or copper tubing. (Do not use regular hoses.)
10. Evacuate system to maximum absolute holding pressure of 200 microns or less. NOTE: This process can be speeded up by use of heat lamps, or by breaking the vacuum with refrigerant or dry nitrogen at 5,000 microns. Pressure system to 5 PSIG and leave in system a minimum of 10 minutes. Recover refrigerant, and proceed with evacuation of a pressure of 200 microns or a minimum of 10%.
11. Break vacuum by charging system from the high side with the correct amount of refrigerant specified. This will prevent boiling the oil out of the crankcase.

NOTE: If the entire charge will not enter the high side, allow the remainder to enter the low side in

small increments while operating the unit.

12. Restart unit several times after allowing pressures to stabilize. Pinch off process tubes, cut and solder the ends. Remove pinch off tool, and leak check the process tube ends.

#### 11.2.4 Special procedure in the case of compressor motor burnout.

1. Recover all refrigerant and oil from the system.
2. Remove compressor, capillary tube and filter drier from the system.
3. Flush evaporator condenser and all connecting tubing with dry nitrogen or equivalent, to remove all contamination from system. Inspect suction and discharge line for carbon deposits. Remove and clean if necessary.
4. Reassemble the system, including new drier strainer and capillary tube.
5. Proceed with processing as outlined under hermetic component replacement.

#### 11.2.5 Rotary compressor special troubleshooting and service

Basically, troubleshooting and servicing rotary compressors is the same as on the reciprocating compressor with only a few exceptions.

1. Because of the spinning motion of the rotary, the mounts are critical. If vibration is present, check the mounts carefully.
2. The electrical terminals on the rotary are in a different order than the reciprocating compressors. The terminal markings are on the cover gasket. Use your wiring diagram to insure correct connections.

#### 11.2.6 Refrigerant charge

1. The refrigerant charge is extremely critical. It must be measured charge carefully - as exact as possible to the nameplate charge.
2. The correct method for charging the rotary is to introduce liquid refrigerant into the high side of the system with the unit off. Then start compressor and enter the balance of the charge, gas only, into the low side.

The introduction of liquid into the low side, without the use of a capillary tube, will cause damage to the discharge valve of the rotary compressor.

NOTE: All inoperative compressors returned to Friedrich must have all lines properly plugged with the plugs from the replacement compressor.

## **11.3 Fan motor**

A single phase permanent split capacitor motor is used to drive the evaporator blower and condenser fan. A self-resetting overload is located inside the motor to protect against high temperature and high amperage conditions.

#### 11.3.1 Fan motor test

1. Determine that capacitor is serviceable.
2. Disconnect fan motor wires from fan speed switch or system switch.
3. Apply "live" test cord probes on black wire and common terminal of capacitor. Motor should run at high speed.

4. Apply "live" test cord probes on red wire and common terminal of capacitor. Motor should run at low speed.
5. Apply "live" test cord probes on each of the remaining wires from the speed switch or system switch to test intermediate speeds.

## **11.4 Capacitor**

A run capacitor is wired across the auxiliary and main winding of a single phase permanent split capacitor motor such as the compressor and fan motor. A single capacitor can be used for each motor or a dual rated capacitor can be used for both.

The capacitor's primary function is to reduce the line current while greatly improving the torque characteristics of a motor. The capacitor also reduces the line current to the motor by improving the power factor of the load. Run capacitor hook-up line side of the capacitor is marked with a red dot and is wired to the line side of the circuit

### 11.4.1 Capacitor test

1. Remove capacitor from unit.
2. Check for visual damage such as bulges, cracks, or leaks.
3. For dual rated, apply an ohmmeter lead to common (C) terminal and the other probe to the compressor (HERM) terminal. A satisfactory capacitor will cause a deflection on the pointer, and then gradually move back to infinity.
4. Reverse the leads of the probe and momentarily touch the capacitor terminals. The deflection of the pointer should be two times that of the first check if the capacitor is good.
5. Repeat steps 3 and 4 to check fan motor capacitor.

NOTE: A shorted capacitor will indicate a low resistance and the pointer will move to the "0" end of the scale and remain there as long as the probes are connected.

An open capacitor will show no movement of the pointer when placed across the terminals of the capacitor.

12 Characteristic of temperature sensor

电阻互换精度 : R25 = 5.0KΩ±1.0%  
 B25-50 = 3470k±1.0%

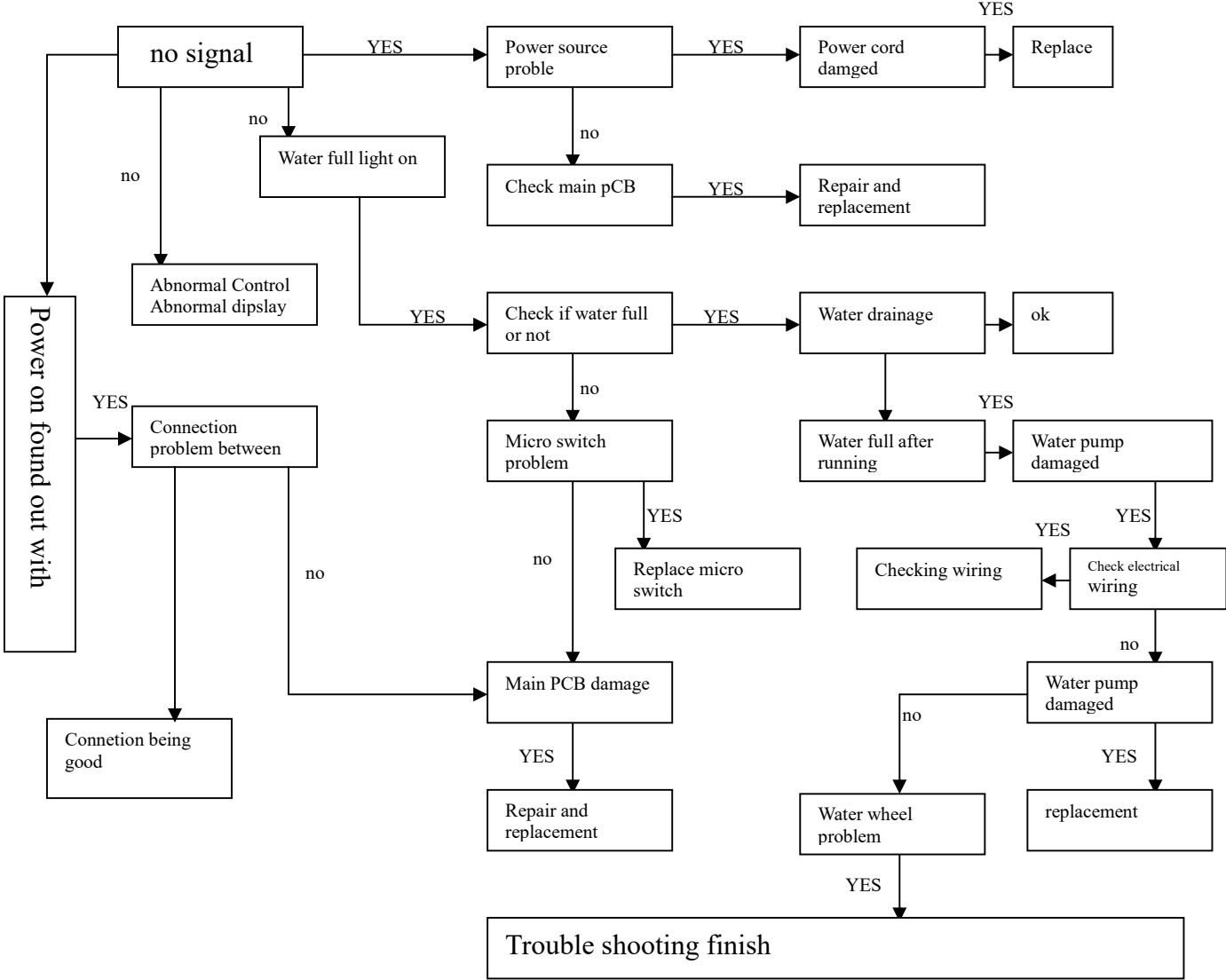
T (°C)	Rmin (KΩ)	R (KΩ)	Rmax (KΩ)	T (°C)	Rmin (KΩ)	T (°C)	Rmax (KΩ)
-30.000	61.427	60.647	66.959	26.000	4.960	6.000	6.080
-29.000	66.196	60.266	62.402	26.000	4.761	4.911	4.861
-28.000	66.162	67.062	69.074	27.000	4.630	4.630	4.680
-27.000	62.263	64.094	66.941	28.000	4.407	4.457	4.507
-26.000	49.630	61.260	62.992	29.000	4.242	4.291	4.341
-26.000	47.032	46.699	60.216	30.000	4.084	4.133	4.182
-24.000	44.629	46.092	47.698	31.000	3.902	3.951	4.000
-23.000	42.362	43.729	45.155	32.000	3.787	3.836	3.884
-22.000	40.223	41.496	42.810	33.000	3.648	3.696	3.744
-21.000	38.206	39.396	40.619	34.000	3.516	3.565	3.613
-20.000	36.299	37.411	38.663	35.000	3.388	3.436	3.483
-19.000	34.600	36.609	36.606	36.000	3.266	3.313	3.360
-18.000	32.800	35.770	34.766	37.000	3.148	3.194	3.241
-17.000	31.194	32.101	33.050	38.000	3.036	3.082	3.127
-16.000	29.677	30.624	31.392	39.000	2.928	2.973	3.019
-16.000	28.242	29.033	29.944	40.000	2.826	2.869	2.914
-14.000	26.886	27.626	28.388	41.000	2.726	2.770	2.814
-13.000	26.601	26.293	27.000	42.000	2.631	2.674	2.718
-12.000	24.367	25.033	26.694	43.000	2.539	2.582	2.626
-11.000	22.237	23.941	24.469	44.000	2.452	2.494	2.536
-10.000	22.146	22.716	23.290	45.000	2.368	2.409	2.451
-9.000	21.117	21.646	22.188	46.000	2.287	2.328	2.369
-8.000	20.141	20.656	21.158	47.000	2.209	2.249	2.290
-7.000	19.216	19.677	20.146	48.000	2.134	2.174	2.214
-6.000	18.337	18.769	19.209	49.000	2.063	2.102	2.141
-6.000	17.606	17.909	18.321	50.000	1.994	2.032	2.071
-4.000	16.716	17.094	17.478	61.000	1.927	1.966	2.005
-3.000	16.967	16.320	16.680	62.000	1.864	1.901	1.938
-2.000	16.266	15.697	16.922	63.000	1.802	1.839	1.876
-1.000	14.621	14.990	15.204	64.000	1.743	1.779	1.816
0.000	13.940	14.229	14.620	66.000	1.686	1.722	1.767
1.000	13.332	13.602	13.976	68.000	1.632	1.666	1.702
2.000	12.783	13.006	13.262	67.000	1.679	1.613	1.643
3.000	12.303	12.459	12.679	69.000	1.628	1.560	1.606
4.000	11.690	11.901	12.124	69.000	1.479	1.512	1.546
6.000	11.163	11.389	11.690	60.000	1.402	1.466	1.493
6.000	10.709	10.902	11.097	61.000	1.307	1.419	1.461
7.000	10.269	10.459	10.622	62.000	1.243	1.376	1.406
8.000	9.850	9.999	10.169	63.000	1.201	1.332	1.362
9.000	9.432	9.579	9.753	64.000	1.261	1.291	1.321
10.000	9.035	9.180	9.328	66.000	1.222	1.261	1.281
11.000	8.663	8.800	8.938	66.000	1.184	1.213	1.242
12.000	8.310	8.438	8.667	67.000	1.147	1.176	1.206
13.000	7.973	8.093	8.213	68.000	1.112	1.140	1.169
14.000	7.662	7.765	7.876	69.000	1.078	1.106	1.134
16.000	7.346	7.460	7.664	70.000	1.046	1.073	1.100
16.000	7.064	7.161	7.268	71.000	1.014	1.041	1.068
17.000	6.775	6.866	6.966	72.000	0.984	1.010	1.036
18.000	6.509	6.593	6.677	73.000	0.954	0.980	1.006
19.000	6.266	6.333	6.411	74.000	0.926	0.961	0.976
20.000	6.012	6.066	6.167	76.000	0.899	0.923	0.948
21.000	5.760	5.847	5.916	76.000	0.872	0.896	0.921
22.000	5.569	5.621	5.604	77.000	0.846	0.870	0.894
23.000	5.346	5.406	5.463	78.000	0.821	0.846	0.869
24.000	5.144	5.193	5.262	79.000	0.796	0.820	0.844
26.000	4.960	5.000	5.060	80.000	0.774	0.797	0.820

**13 Trouble shooting**

PROBLEM	POSSIBLE CAUSE	REMEDY
No power display on panel or any one of the buttons failure.	Power failure	Check the power supplier if the power supplier is supplied to the unit. Check the power cord and correct if damaged.
	Transformer (Discharge transformer before testing)	Check resistance between the two input/output lines on transformer. Replace the transformer if either of the input/output is open or the transformer is damaged.
	Display board or main PCB failure	Check the voltage on display board. Replace the display board if it is +5V else replace the main PCB.
Remote control failure.	Battery failure	Check the voltage of battery. Replace batteries if the voltage is lower than 2.3V.
	Fan motor runs intermittently	Cycles on overload.
Test capacitor. Replace if not within +/-10% of manufacture's rating.		
Check bearings. Replace the motor if the blower wheel cannot rotate freely.		
Pay attention to any change from high speed to low speed. Replace the motor if the speed does not change.		
Compressor stops instantly after startup.	Refrigerant	The amount of the refrigerant is too much, making the compressor load too big. Recycle and recharge the refrigerant after checking for the reason.
	Compressor	The compressor is blocked inside. Replace after checking for the reason.
Fan motor will not run.	No power	Check voltage at electrical outlet. Correct if none.
	Water alarm	Check and correct if water alarm happens.
	Power supply cord	Check voltage at the power cord terminal on Main PCB. Replace the power cord if none.
	Transformer (Discharge transformer before testing)	Check resistance between the two input/output lines on transformer. Replace the transformer if either of the input/output is open or the transformer is damaged.
	Wire disconnected or connection loose	Connect wire. Refer to wiring diagram for terminal identification. Repair or replace loose terminal.
	Main PCB failure	Select fan speed and Check the voltage on main PCB. Replace the main PCB if no voltage in anyone.
	Capacitor (Discharge capacitor before testing)	Test capacitor. Replace if not within +/-10% of manufacture's rating. Replace if shorted, open or damaged.
	Will not rotate	Fan blower hitting scroll. Realign assembly. Check fan motor bearings. Replace the motor if motor shaft do not rotate.
Fan motor noise.	Fan blower	Replace the fan blower if cracked, out of balance, or partially missing.
	Loose screws	Tighten them.
	Worn bearings	Replace the motor if knocking sounds continue when running or loose, or the motor hums or noise appears to be internal while running.
Compressor will not run while fan motor runs.	Voltage	Check voltage. Call Supply Authority if not within limits.
	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.
	Main PCB failure	Check voltage of main PCB. Replace the main PCB if open.
	Capacitor (Discharge capacitor before testing)	Check the capacitor. Replace if not within +/-10% of manufacturers rating. Replace if shorted, open, or damaged.

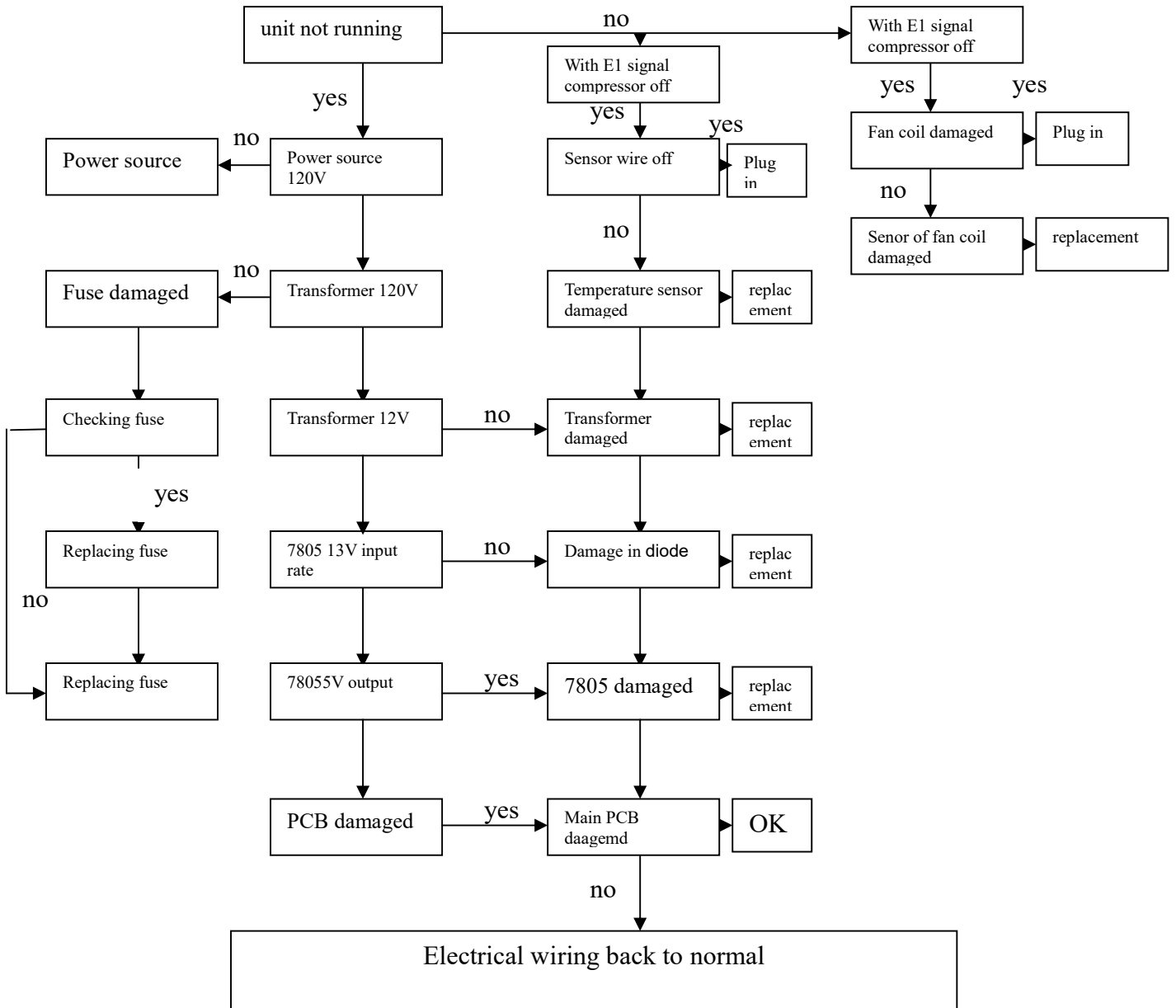
	Room temp sensor	Check the temperature setting if not at the coolest (in cooling mode) or the warmest (in heating mode). Set it if not.
	Compressor	Check the compressor for open circuit or ground. If open or grounded, replace the compressor.
Excessive noise.	Copper tubing	Remove the cabinet and carefully rearrange tubing not to contact cabinet, compressor, shroud and barrier.
Water full alarm	Water tank full	Check and pour if the water tank is full.
	Water depth sensor if failure	Check and replace if failure.
	Water depth is over load in chassis	Check and drainage the water in the chassis by open the drainage hose on the chassis.
	Water depth sensing structure	Check and replace or realign if the structure is failure.
Cooling or heating feels not good	Air filter	Clean or replace if restricted.
	Air discharge pipe	Realign and assemble if the installation of the air discharging pipe failure. Replace if damaged.
	Unit undersized	Determine if the unit is properly sized for the area to be cooled or heated.
	Condenser and Evaporator	Clean or replace if restricted.
	Circulation in condensing water	To check wether water motor damaged or water hose is block or not
	Fan motor	Check the fan capacitor and replace if not within +/-10% of manufactures rating.
	Air flow	Clean or remove if any barrier is found to block the inlet/outlet wind flow of the unit.
	Less refrigerant	Check the tubes for reasons of leakage. Recycle the refrigerant, correct the leakage points and recharge.
	Capillary tube	Regulate the flow if capillary tube and make the evaporating temperature appropriate if the evaporator is frosted. Replace if blocked. Repair joint if leaking.
	Compressor	The inlet and outlet valve of the compressor is damaged, making the low pressure connected with the high pressure. The refrigerating system can not produce high pressure and low pressure. Replace the compressor after checking for the reason.
	Heat sources	Reduce if too many.
No cooling or heating.	No power	Check the voltage. Call an electrician if no within the limit.
	Wiring	Check the terminals. Repair and correct if loose.
	Temperature setting	Check and adjust the temperature setting.
	Mode setting	Check and adjust the mode setting.
	Compressor	Check and replace if the compressor, the over-load protector or wiring is broken.
	Electric heater failure	Check and replace if the heater is damaged.
	Over heat fuse failure	Check and replace if the fuse is damaged.
	Main PCB	Check the voltage of main PCB. Replace the main PCB when the unit failure in heating mode.
The unit starts and stops frequently.	Power supply	The input power supply voltage is too low. Call an electrician if not within limits.
	Main PCB	Check and replace the main PCB if the compressor relay on PCB is shorted or damaged.
	Room temperature	When the room temperature is too high, the compressor will protect.

Trouble shooting problems





Trouble shooting for electrical system



# NOTE CONCERNING PROTECTION OF ENVIRONMENT

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This product must not be disposed of via normal household waste after its service life, but must be taken to a collection station for the recycling of electrical and electronic devices. The symbol on the product, the operating instructions or the packaging indicate such disposal procedures. The materials are recyclable in accordance with their respective symbols. By means of re-use, material recycling or any other form of recycling old appliances you are making an important contribution to the protection of our environment. Please ask your local council where your nearest disposal station is located.

In case of quality problem or other please contact your local supplier or authorized service center.

**Emergency number: 112**

## PRODUCER

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[www.sinclair-world.com](http://www.sinclair-world.com)

This product was manufactured in China (Made in China).

## REPRESENTATIVE

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## TECHNICAL SUPPORT

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