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# Air Conditional Service Manual

# Model:
# AC-FR30HK

# CONTENTS

# SPECIFICATION

| **Model No.** | | | | **AC-FR30HK** |
|---|---|---|---|---|
| Type | | | | Floor standing (Heating Pump) |
| Cooling Capacity (Btu/h) | | | | 24000 |
| Heating Capacity (Btu/h) | | | | 26600 |
| Rated Input (w) | Cooling | | | 2820 |
| | Heating | | | 2650 |
| PTC Heater Power (W) | | | | 1900 |
| Moisture Removal (L/H.r) | | | | 3.0 |
| Air Circulation (CMH Max) | | | | 1200 |
| EER for Cooling (Btu/h.W) | | | | 8.5 |
| COP for Heating (W/W) | | | | 2.9 |
| ***Power Supply*** | | | | |
| Volt/Phase/Hz | | | | 220-240V/1P/50Hz |
| Rated Current (A) | Cooling | | | 13.5 |
| | Heating | | | 12.5 |
| | PTC Heater | | | 8.7 |
| LRA (A) | | | | 65 |
| ***Noise Level (dB (A))*** | Indoor Unit | High | | 50 |
| | | Low | | 40 |
| | Outdoor Unit | | | 58 |
| ***System*** | | | | |
| Refrigerant (g) | | | | R22 |
| Compressor type | | | | Scroll |
| Compressor Model No. | | | | PH440X3CS-8KUC1 |
| Compressor MFG | | | | TOSHIBA |
| Expansion Device | | | | Capillary |
| Evaporator | | | | Copper and Aluminum Fin |
| Condenser | | | | Copper and Aluminum Fin |
| *Features* | | | | |
| LCD Wireless Remote Controller | | | | No |
| LCD Display | | | | Yes |
| Washable Filter | | | | Yes |
| 24 Hours Timer | | | | Yes |
| 3 Speed Control | | | | Yes |
| Vertical Auto Swing Louver | | | | Yes |
| Horizontal Auto Swing Louver | | | | No |

| **Model No.** | | **AC-FR30HK** |
|---|---|---|
| Sleep Operation | | No |
| Smart Function | | Yes |
| Jet Function | | Yes |
| Electronic Lock | | Yes |
| Auto Restart | | Yes |
| PTC Heater | | Yes |
| *Other* | | |
| Dimensions WxHxD(mm) | Indoor Unit | 540x1765x275 |
| | Outdoor Unit | 832x702x380 |
| Net Weight (Kg) | Indoor Unit | 46 |
| | Outdoor Unit | 66 |
| Packing Dimensions WxHxD(mm) | Indoor Unit | 660x1890x420 |
| | Outdoor Unit | 980x780x420 |
| Gross Weight (Kg) | Indoor Unit | 54 |
| | Outdoor Unit | 80 |
| Loading Capacity (40’/40’ HC) | | 72/80 |
| Approvals | | CCEE |

# FUNCTION DETAILS

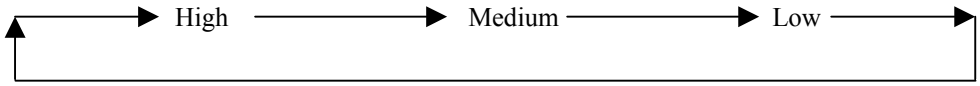
## Button Introducing

### 1. ON/OFF button

Pressing this button at waiting orders to operate unit according to last operating mode. Pressing it for the first time after power supply, unit will operate in AUTO mode. Pressing it during operation, all loads stop, compressor turns into 3 minutes protection, LCD displays room temperature.

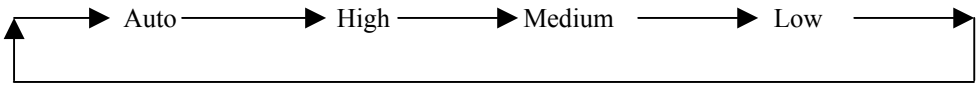
### 2. FAN button

Indoor fan motor operates according to the following circle while pressing the button in FAN mode.




FAN button is ineffective in DRY mode.

Indoor fan motor operates according to the following circle while pressing the button in other modes.



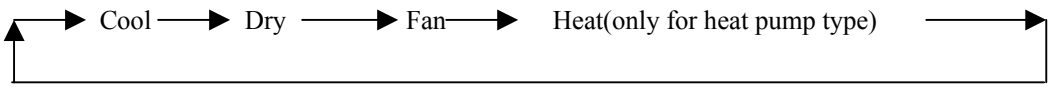

### 3. SWING/LOCK button

Press once to turn on or off swing motor. Press this button for 5 seconds and buzzer sounds once, the key set is locked and not manipulative, operation with remote controller is ineffective. Lock is unchained only pressing Swing/Lock button for 5 seconds and buzzer sounds once.

Note: LOCK function only for E-type floor standing

### 4. MODE button

A/C operates according to the following circle while pressing this button :



**5. TEMPERATURE RISE button**

Pressing this button once in cooling & heating mode, setting temperature is risen 1℃ till 32℃. Pressing this button once in smart & dry modes, setting temperature is risen 1℃, but the maximum rise is 2℃. This button is ineffective in other modes.

**6. TEMPERATURE DROP button**

Pressing this button once in cooling & heating mode, setting temperature is dropped 1℃ till 18℃. Pressing this button once in smart & dry modes, setting temperature is dropped 1℃ , but the maximum drop is 2℃. This button is ineffective in other modes.

**7. TIMER button**

Pressing this button for the first time, ——h is displayed and the TIMER symbol is flashed on the LCD. Pressing the button once to increase the preset time 0.5 hour (with 10 hours) or 1 hour(over 10 hours). Timing range is from 0.5 hour to 24 hours. Press TIMER function until ——h is displayed, timing is cancelled. Indicative symbol lights or extinguishes after stopping pressing button for 5 seconds, affirming setting time to start timer or cancel it.

**8. SMART button**

Press the SMART button, the unit enters smart mode (fuzzy logic operation) directly regardless of the unit is on or off. In this mode, temperature and fan speed are automatically set based on the actual room temperature. Operation mode and temperature are determined by indoor temperature according to the following table:

## Heat pump models

| Indoor temperature | Operation mode | Target temperature |
|---|---|---|
| 21℃ or below | HEATING | 22℃ |
| 21℃ -26℃ | DRY | Room temperature decrease 1.5℃ after operate for 3 minutes |
| Over 26℃ | COOLING | 26℃ |

## Cooling only models

| Indoor temperature | Operation mode | Target temperature |
|---|---|---|
| 26℃ or below | DRY | Room temperature decrease 1.5℃ after operate for 3 minutes |
| Over 26℃ | COOLING | 26℃ |

SMART button is ineffective in SUPER mode. Temperature and airflow are controlled automatically in SMART mode. However, a decrease or rise of up to 2 ℃ can be set with the remote controller according to the following table if you still feel uncomfortable.

| A decrease or increase up to 2℃ can be set in SMART mode | | |
|---|---|---|
| **Your feeling** | **button** | **adjustment procedure** |
| **Slightly warmer** A decrease up to 2℃ can be set | ▼ | A Press once to lower the set temp by 1℃ (High / Low)<br>B Press twice to lower the set temp by 2 ℃ (High / Low) |
| **Slightly cooler** A rise up to 2℃ can be set | ▲ | A Press once to raise the set temp by 1 ℃ (High / Low)<br>B Press twice to raise the set temp by 2℃ . (High / Low) |
| Uncomfortable because of unsuitable air flow volume. | FAN | Indoor fan speed alternates among High, Medium and Low each time this button is pressed. |
| Uncomfortable because of unsuitable flow direction. | SWING/LOCK | Press it once, the vertical adjustment louver swings to change vertical airflow direction. Press it again, swings stops. For horizontal airflow direction, please refer to the previous page for details. |

**9. AUTO RESTART button**

Pressing this button to start AUTO RESTART function, LCD displays AUTO RESTART symbol. Pressing it again to cancel AUTO RESTART function.

**10. SUPER button**

Pressing this button at waiting orders to operate unit in super cool or heat mode. Pressing this button while running to go out of primary operation and into super cool or heat mode.

**11. LIGHT button (only for E-type floor standing)**

Pressing this button to turn on or off the fluorescent light.

## Function Introducing

**1. BUZZER FUNCTION**

Buzzer exports different period of time according to different operation.

**Turn on**: sound twice, phonate for 100MSEL, stall for 50MSEL, phonate for 100MSEL

**Turn off**: sound twice, phonate for 250MSEL, stall for 50MSEL, phonate for 50MSEL

**Overheating protection**: sound times, phonate for 50MSEL, stall for 50MSEL, phonate for 50MSEL, stall for 50MSEL, phonate for 50MSEL, stall for 50MSEL, phonate for 100MSEL

**Common cue symbol**: sound once, phonate for 50MSEL

**2. VERTICAL VANE CONTROL**

Using "SWING/LOCK" button to set various angles of flow or specific angle as you like. Pressing "SWING/LOCK" button once, the vertical adjustment louver will swing up and down automatically. Pressing the "SWING/LOCK" button again when the louvers swing to a suitable angle as desired.

**3. INDOOR FAN MOTOR CONTROL**

Indoor fan motor elicited wiring rev depends on relay. It has 3 speeds.

**4. ELECTRICAL HEATING FUNCTION (only for heat pump type)**

Electrical heating starts automatically according to the following conditions when A/C operates in heating mode. If inlet air temperature of indoor unit is below 20℃, the temperature difference between inlet and outlet of indoor unit is more than 2.5℃, compressor operates for 3 minutes, indoor fan motor operates normally and indoor pipe temperature is below 48℃. If it falls short of these conditions, system pauses electrical heating. If it accords with conditions again after pause, A/C requires 5 seconds delay for starting electrical heater. If electrical heater pauses because indoor pipe temperature is more than 48℃, it starts again only while indoor pipe is below 43℃. Cold wind prevention is canceled automatically after electrical heater start.

## 5. DEFROST FUNCTION

During HEATING operation, when outdoor pipe temperature falls to **–8℃** and compressor operates for 50 minutes, defrosting starts, outdoor fan motor & compressor stop, indoor fan motor operates in preventing cold air mode. 4-valve turns off after 59 seconds, compressor starts to defrost after stalling for over 1 minute.

When outdoor pipe temperature rises to 12℃, defrosting rescinds automatically, compressor stalls. 4-valve starts after 59 seconds, compressor and outdoor fan motor start after stalling for over 1 minute, indoor fan motor operates in preventing cold air mode, the system operates at HEATING mode. Next defrosting starts after compressor operates for 50 minutes in HEATING mode. Every defrosting time doesn't exceed 10 minutes. If defrosting time exceeds 10 minutes, system rescinds defrosting forcibly and operates at HEATING mode. Button is ineffective besides ON/OFF button during defrosting.

## 6. SLEEP FUNCTION

Pressing SLEEP button of remote controller in any mode, buzzer sounds once after controller receive and system is turned into SLEEP function, indoor fan motor speed translates tiny speed, LCD displays SLEEP symbol.

If air inlet temperature of indoor unit is equal to or more than 26℃ in cooling mode, setting temperature is invariable, otherwise setting temperature rises 0.5℃ per 1 hour within 2 hours. The total setting temperature rise is 1℃, airflow direction according to primary setting mode, but it can be adjusted, operation mode is invariable. A/C turn off automatically after setting SLEEP function 8 hours later.

## 7. PROTECTION FUNCTION

### 7.1 3-minutes delay for compressor:

In all modes, compressor doesn't respond temperature changed until it operate for 3 minutes, compressor can restart after it stall for 3 minutes.

### 7.2 OVERCOOL PROTECTION

If indoor pipe temperature is below-3℃ for continuous 3 minutes in cool and dry modes, compressor and outdoor fan motor stall, LCD displays protection code E1. If indoor pipe temperature is over 5℃, the system retreats from overcool protection and operates normally.

### 7.3 OVERHEAT PROTECTION(only for heat pump type)

If indoor pipe temperature is over 53℃ in heat mode, outdoor fan motor stalls. If indoor pipe temperature is below 48℃, the system retreats from overheat protection and operates normally. If indoor pipe temperature is over 63℃ when A/C operates for 1 minutes in heat mode, buzzer sounds 4 times, LCD displays protection code E2

### 7.4 PRESSURE PROTECTION

When the system pressure is too high , the compressor and outdoor fan stalls ,LED displays blooey code “E3”. The A/C can’t operate until the system pressure drops to normal level.

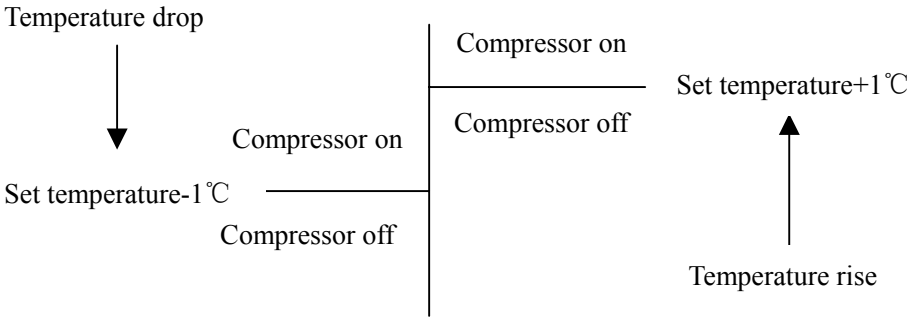
### 7.5 TROUBLE CODE

LCD displays setting temperature or timing hour when A/C is normal. LCD displays trouble code if protection function appears.

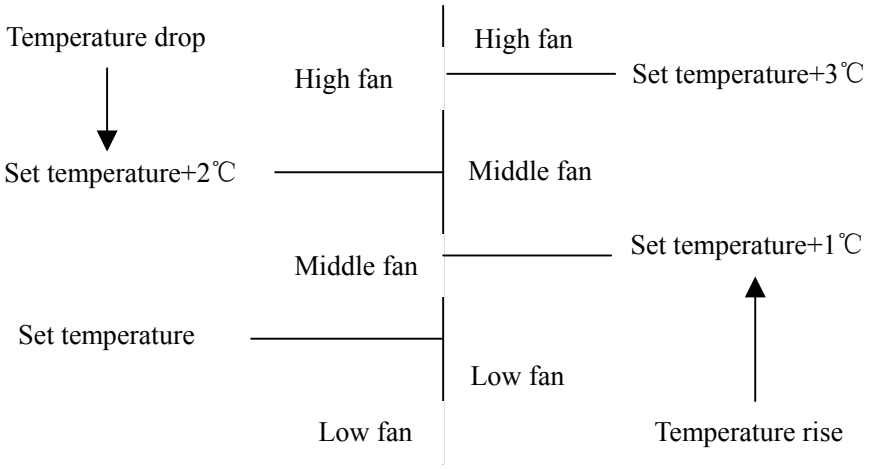
## Operation Mode

### 1. COOLING MODE

When the COOLING mode operation is selected without setting temperature after power supply, the appliance will set the preset temperature at 26℃ automatically. The compressor operates according to the following chart:



In COOLING model, if indoor fan motor speed is set automatism, it operates according to the following chart:



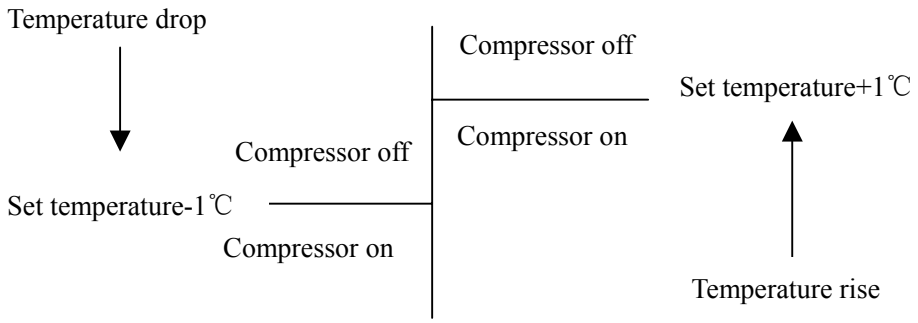

## 2. DRY MODE

When room temperature is 18℃-32℃, A/C operates in COOLING mode for **3** minutes, then it will sense the intake air temperature and minus 1.5℃ as the setting temperature, indoor motor speed is **TINY,** compressor and outdoor fan motor operates in COOLING mode. The setup for fan motor speed is not viable at this time, but airflow direction can be adjusted, setting temperature can be adjusted ±1℃. Overcool protection is effective.

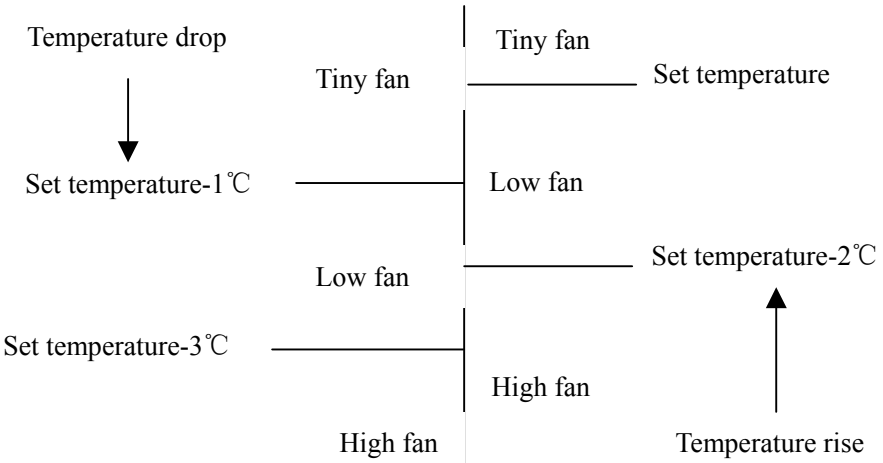
## 3. HEATING MODE

When A/C operates in heating mode, setting temperature, indoor fan motor speed and airflow direction can be adjusted, preventing cold air function starts. If indoor pipe temperature is below 30℃, indoor fan motor speed switches to tiny automatically, if indoor pipe temperature is below 23℃, indoor fan motor stalls, if indoor temperature is over 35℃, indoor fan motor operates normally. During heating operation, overheating protection starts. If indoor pipe temperature is over 53℃, outdoor fan motor stalls. If indoor pipe temperature is below 48℃, the system retreats from overheating protection and operates normally. If indoor pipe temperature is over 63℃ when A/C operates for 1 minutes in heat mode, buzzer sounds 4 times and A/C stalls.

Compressor starts and stalls as the following chart:




In HEATING model, if indoor fan motor speed is set automatism, it operates according to the following chart:

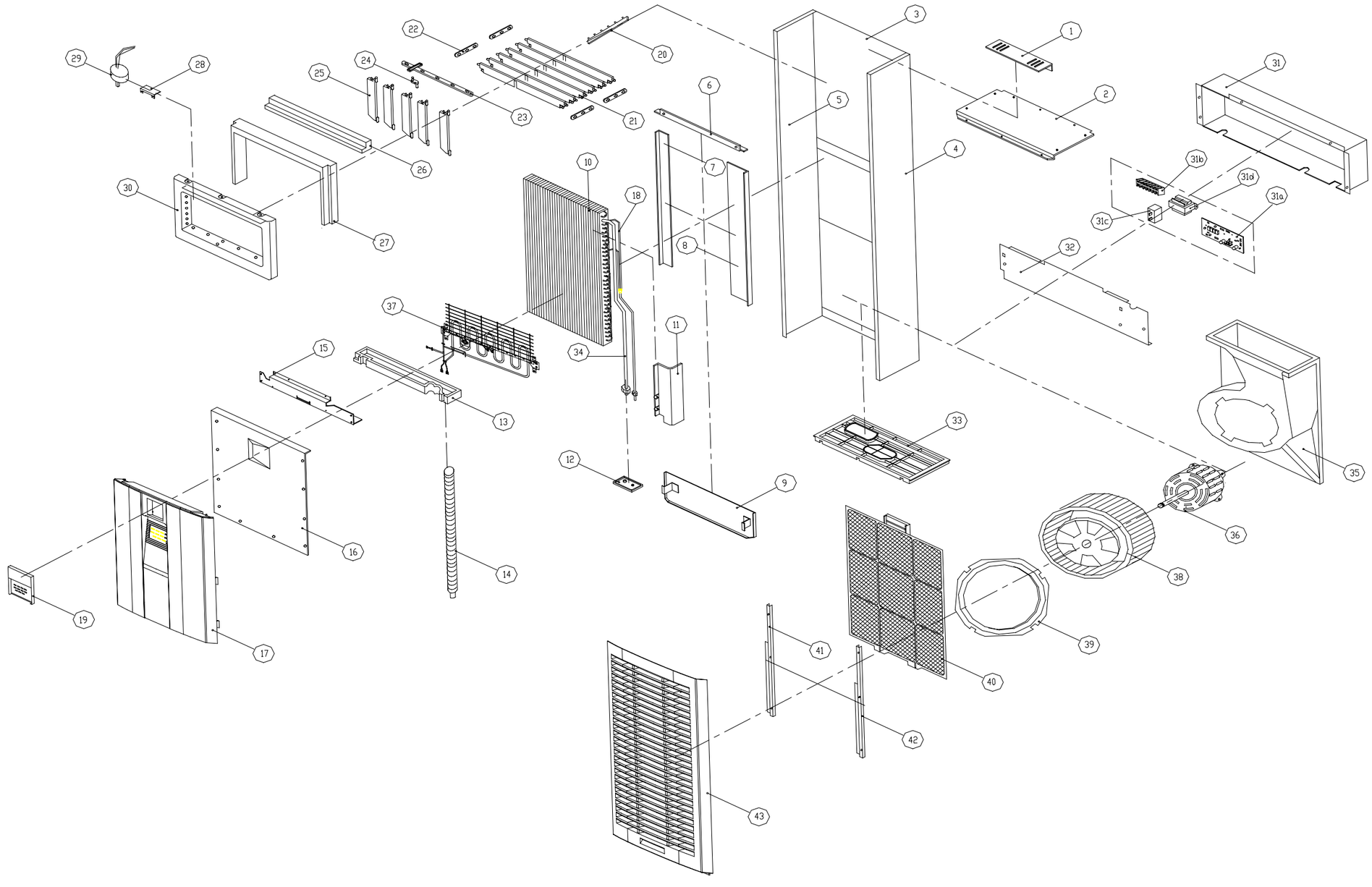



## 4. FAN MODE

Indoor fan motor operates according to setting mode, airflow direction can be adjusted, compressor and outdoor fan motor stall.

# EXPLODED VIEW AND PART LIST

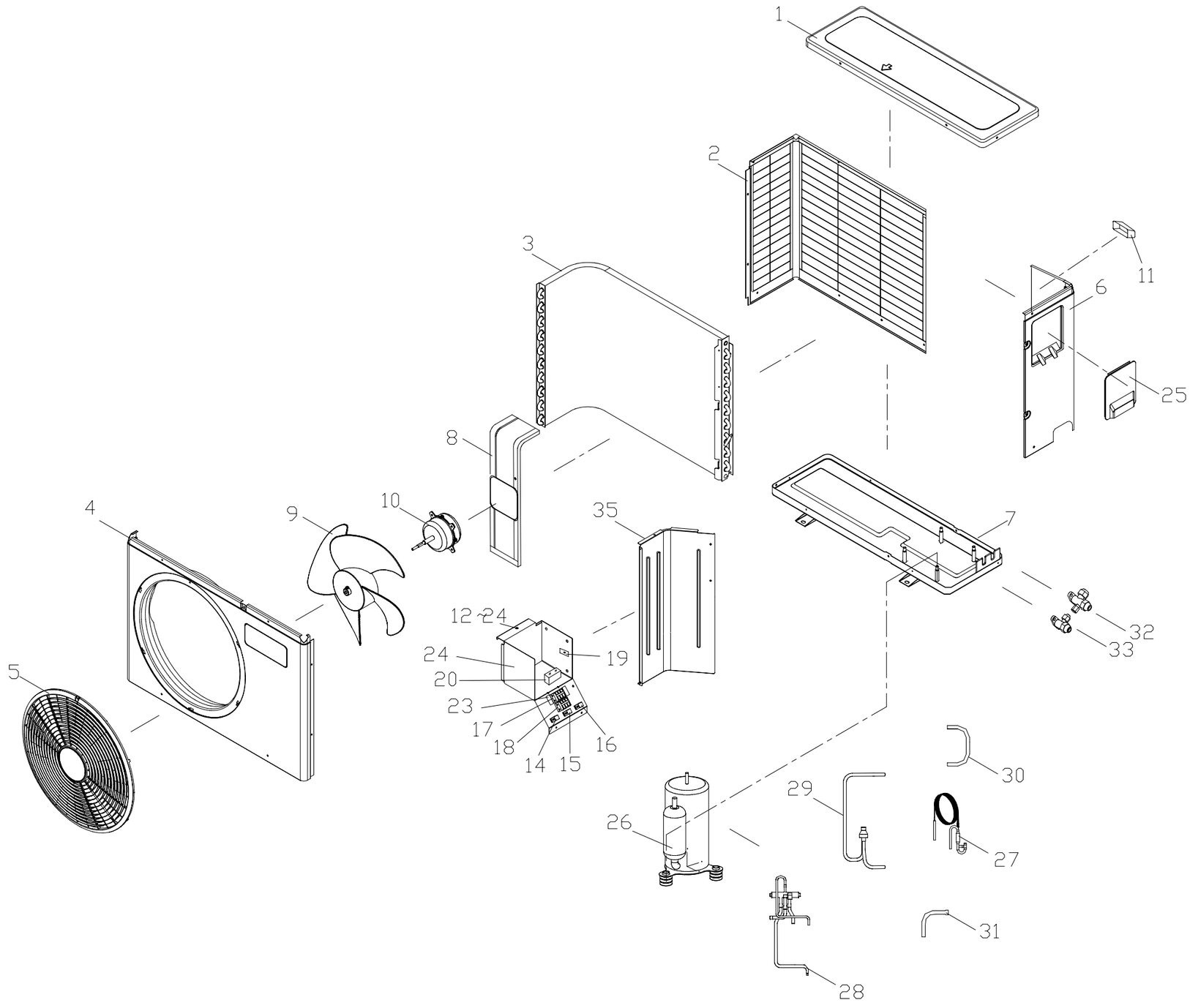
## INDOOR UNIT



## INDOOR UNIT

| No. | Description | Part No. | Q'ty |
|---|---|---|---|
| 1 | Upper installation shelf | 12033011 | 1 |
| 2 | Topmost cover | 1105376 | 1 |
| 3 | Rear cover | 8100914 | 1 |
| 4 | Right side cover | 8100314 | 1 |
| 5 | Left side cover | 8100313 | 1 |
| 6 | Evaporator topmost installation plate | 12033017 | 1 |
| 7 | Evaporator left installation plate | 12033044 | 1 |
| 8 | Evaporator right installation plate | 12033045 | 1 |
| 9 | Evaporator support | 11023032 | 1 |
| 10 | Evaporator | 1301138 | 1 |
| 11 | Evaporator baffle | 10083002 | 1 |
| 12 | Containing water rubber bowl | 21063001 | 1 |
| 13 | Condensate plate assembly | 2106303 | 1 |
| 14 | Drain hose | 21093006 | 1 |
| 15 | Middle support | 100853 | 1 |
| 16 | Adiabatic board | 16053005 | 1 |
| 17 | Front panel | 1006545 | 1 |
| 18 | Evaporator import pipe | 13031950 | 1 |
| 19 | Controller assembly | 8140166 | 1 |
| 20 | Mid pitman | 12013019 | 1 |
| 21 | Horizontal vane | 1201378 | 6 |
| 22 | Side pitman | 12013018 | 4 |
| 23 | Transverse pitman | 12013022 | 1 |
| 24 | Rocker | 12013006 | 1 |
| 25 | Vertical vane | 12013020 | 5 |
| 26 | Air outlet bottom foam | 1107552 | 1 |
| 27 | Air outlet side foam | 1107551 | 1 |
| 28 | Synchronous motor retainer | 11023011 | 1 |
| 29 | Synchronous motor A | 14023037 | 1 |
| 30 | Air outlet | 1201377 | 1 |
| 31 | Electrical box | 10053004 | 1 |
| 31a | Pc board | 8140932 | 1 |
| 31b | Terminal 8PUB | 1502106 | 1 |
| 31c | Fan motor capacitor | 14113055 | 1 |
| 31d | Transformer | 140561 | 1 |
| 32 | Electrical box cover | 11053001 | 1 |
| 33 | Base | 1106276 | 1 |
| 34 | Evaporator deferent pipe | 81303857 | 1 |
| 35 | Volute | 1007122 | 1 |
| 36 | Fan motor | 1402282 | 1 |
| 37 | Electrical heater assembly | 814047 | 1 |
| 38 | Centrifugal fan | 1402155 | 1 |
| 39 | Air inpour annulus | 13031108 | 1 |
| 40 | Air filter | 12043006 | 1 |
| 41 | Filter left retainer | 11023012 | 1 |
| 42 | Filter right retainer | 11023013 | 1 |
| 43 | Nether panel | 1006547 | |

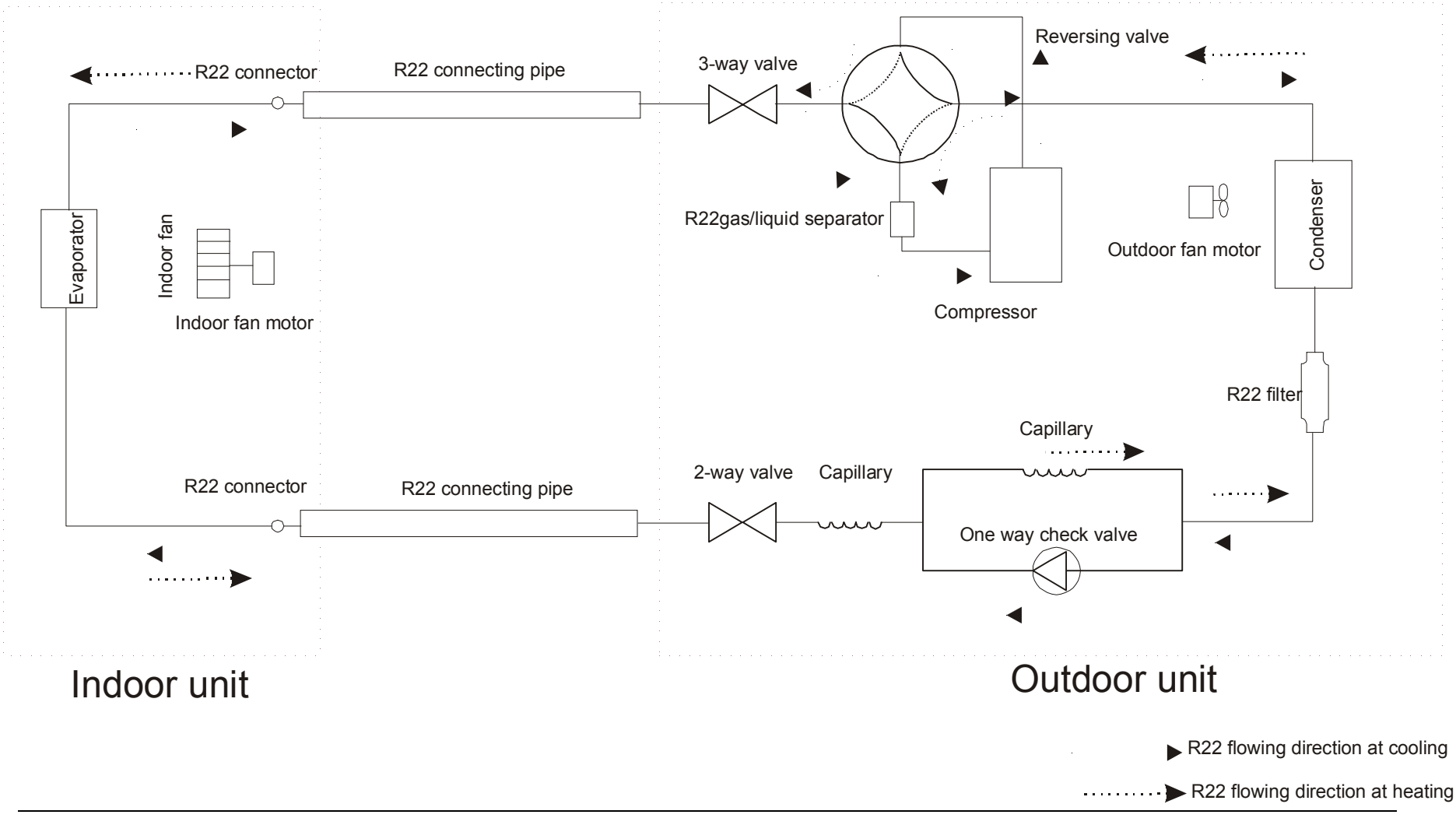
**OUTDOOR UNIT**



## OUTDOOR UNIT

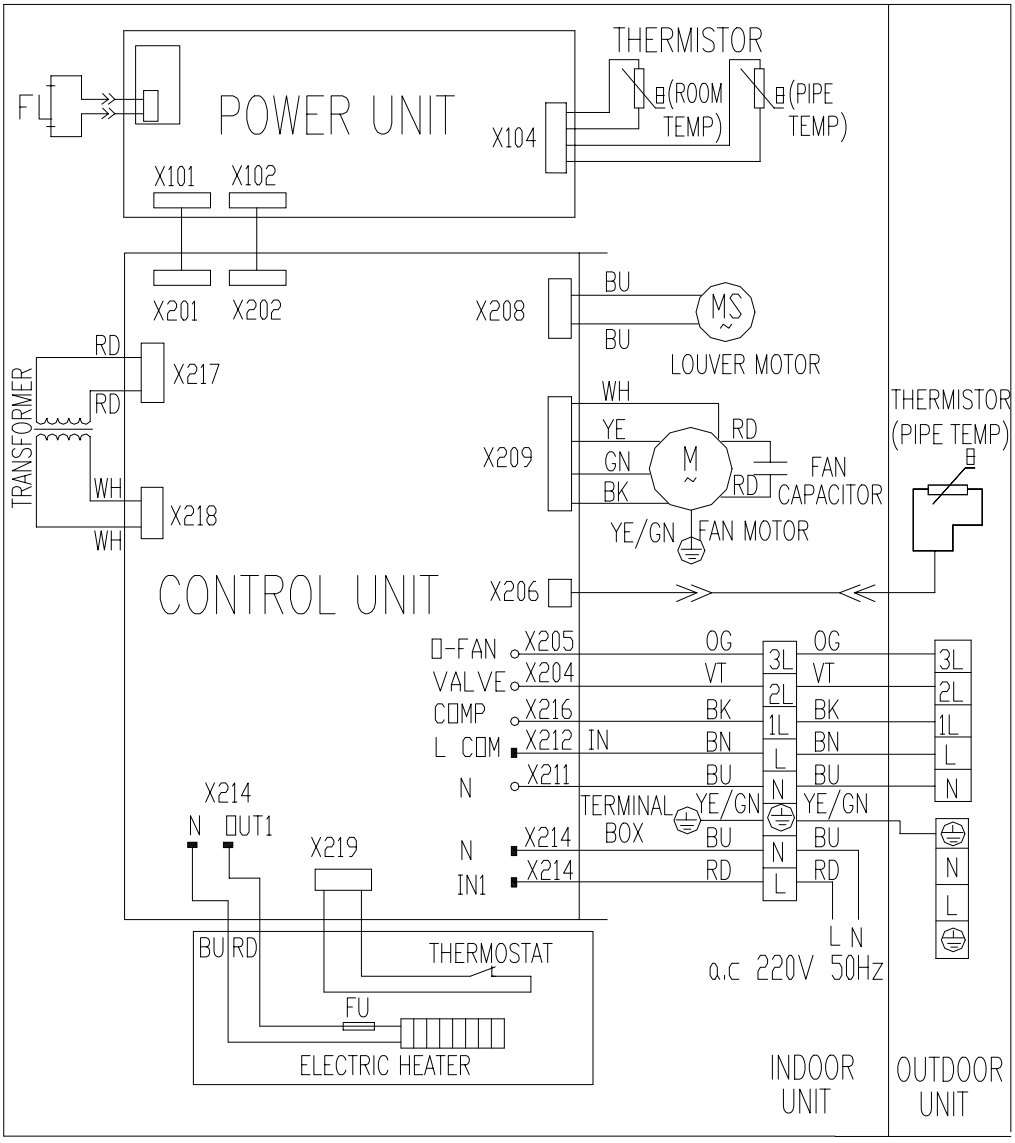
| No. | Description | Part No. | Q'ty |
|---|---|---|---|
| 1 | Upper cover | 810132 | 1 |
| 2 | Rear cover | 810091 | 1 |
| 3 | Condenser | 813022 | 1 |
| 4 | Front cover | 810135 | 1 |
| 5 | Fan guard | | |
| 6 | Right side cover | 10033028 | 1 |
| 7 | Base | 810022 | 1 |
| 8 | Motor support | 811021 | 1 |
| 9 | Propeller fan | 140239 | 1 |
| 10 | Fan motor | 1402370 | 1 |
| 11 | Gripe | 21093063 | 1 |
| 12 | Electrical assembly | 814018 | 1 |
| 13 | Thermionic resistance | 11053010 | 1 |
| 14 | Capacitor clamp | 12033022 | 1 |
| 15 | Wire clamp | 1203234 | 1 |
| 16 | Power wire nether Clamp | 110963 | 1 |
| 17 | Power wire upper Clamp | 1109147 | 1 |
| 18 | Terminal 5P3 | 150288 | 1 |
| 19 | Terminal 4P2 | 15023004(A) | 1 |
| 20 | Terminal 2U | 150217(A) | 1 |
| 21 | Fan capacitor | 14113058 | 1 |
| 22 | AC contactor | 1411941 | 1 |
| 23 | Wire fixer | 1109186 | 1 |
| 24 | Electrical box | 10053005 | 1 |
| 25 | Terminal cover | 2109236 | 1 |
| 26 | Compressor (GD Toshiba) | 1304340 | 1 |
| 27 | Capillary assembly | 81303787 | 1 |
| 28 | 4- valve assembly | 81303530 | 1 |
| 29 | Inspiratory pipe assembly | 81303290 | 1 |
| 30 | Liquid outlet pipe | 813035 | 1 |
| 31 | Transition pipe | 13033038 | 1 |
| 32 | 3-valve assembly | 8130914 | 1 |
| 33 | 2-valve assembly | 8130918 | 1 |
| 34 | Compressor capacitor | 14113044 | 1 |
| 35 | Clapboard | 12033035 | 1 |

# REFRIGERATION DIAGRAM



# WIRING DIAGRAM

**Indoor Unit**



**Outdoor Unit**