



WALL MOUNTED SPLIT-TYPE AIR CONDITIONERS

**DRAFT**

# SERVICE MANUAL

No.TE050616

## Models

- YKEQ - YCNQ 251 GR** □
- YKEQ - YCNQ 331 GR** □
- YKEQ - YCNQ 531 GR** □
- YKEQ - YCNQ 671 GR** □

**With ozone-friendly refrigerant R410A** □



CONTENTS	
1. IMPORTANT NOTICE	..... 2
2. TECHNICAL SPECIFICATION	..... 3
3. OPERATION DETAILS	..... 5
4. WIRING DIAGRAM	..... 13
	.....
	.....



## **IMPORTANT NOTICE**

This service manual is intended for use by individuals possessing adequate backgrounds of electrical, electronic and mechanical experience. Any attempt to repair the appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

The information, specifications and parameter are subject to change due to technical modification or improvement without any prior notice. The accurate specifications are presented on the nameplate label.

### **How to order spare parts**

To have your order filled promptly and correctly, please furnish the following information:

1. Model No. with Indoor or Outdoor
2. No. in the Explosion View
3. Part Name
4. The quantity you ordered

## Technical Specifications

Model No.			YKEQ-YCNQ 251 GR	YKEQ-YCNQ 331 GR
Type			Heat Pump	
Control type			Remote	
Rated cooling capacity	kW		2.45	3.35
Rated heating capacity	kW		2.82	3.40
EER for cooling			2.88	2.82
COP for heating			3.24	2.93
Moisture removal	Liters/h		1.0	1.3
Indoor noise level at cooling	High	dB(A)	36	38
	Med.	dB(A)	34	36
	Low	dB(A)	32	34
Outdoor noise level	dB(A)		54	55
<b>Electrical Data</b>				
Power supply			1-220~240V-50HZ	
Voltage Range		V		
Rated current	Cooling	A	3.9	6.0
	Heating	A	3.6	5.8
Rated input	Cooling	W	850	1140
	Heating	W	790	1140
<b>Refrigerating System</b>				
Refrigerant/Charge		Gram	R410A/540g	R410A/730g
Compressor	Type		Rotary	
	Model		----	----
	LRA	A	----	----
	MFG		----	----
Evaporator			Louver fin and grooved tube type (φ 7)	
Condenser			Corrugated fin and grooved tube type (φ 9.52)	
Expansion device			Capillary tube	
Defrosting system			Microcomputer controlled reverse system	
<b>Fan System</b>				
Indoor air circulation/Hi Cooling		m <sup>3</sup> /h	430	530
Indoor fan type			Cross flow	
Indoor fan speed H/M/L	Cooling	rpm	1150/1050/950	1270/1170/1000
	Heating	rpm	1150/1050/950	1250/1150/1000
	Dry	rpm	950	950
	Sleep	rpm	950	950
Indoor fan motor output		W	12	12
Outdoor air circulation		m <sup>3</sup> /h	2080	2380
Outdoor fan type			Propeller fan	
Outdoor fan speed		rpm	860	860
Outdoor fan motor output		W	31	31
<b>Connections</b>				
Refrigerant coupling			Flare type	
Connecting Pipe	Gas	Inches	3/8	1/2
	Liquid	Inches	1/4	1/4
Connecting Wiring	Size x Core number			
Drainage Pipe			O.D 16mm	
<b>Others</b>				
Suitable area		m <sup>2</sup>	12~19	16~28
Net dimensions (W x H x D)	Indoor	mm	718 x 240 x 180	770 x 240 x 180
	Outdoor	mm	700 x 552 x 256	760 x 552 x 256
Net weight	Indoor	kg	7	8
	Outdoor	kg	32	34
Packing dimensions (W x H x D)	Indoor	mm	805 x 325 x 270	863 x 325 x 270
	Outdoor	mm	803 x 598 x 380	863 x 605 x 376
Gross weight	Indoor	kg	10	11
	Outdoor	kg	35	38
Loading Capacity	40°/40°HC		111/238/276	106/236/248

## Technical Specifications

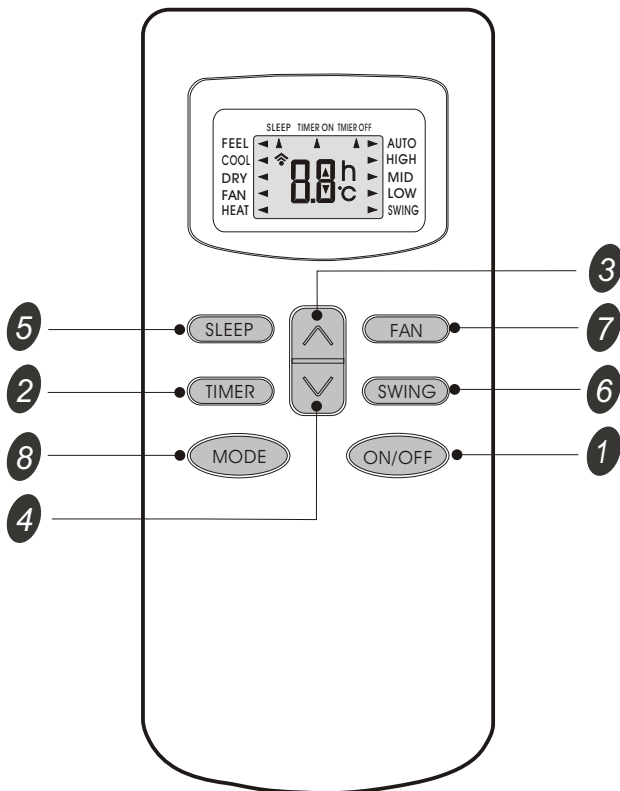
Model No.			YKEQ-YCNQ 531 GR	YKEQ-YCNQ 671 GR
Type			Heat pump	Heat pump
Control type			Remote	Remote
Rated cooling capacity	kW		5.30	6.70
Rated heating capacity	kW		5.70	7.50
EER for cooling			2.82	2.73
COP for heating			3.20	2.98
Moisture removal	Liters/h		2.0	2.6
Indoor noise level at cooling	High	dB(A)	42	49
	Med.	dB(A)	40	47
	Low	dB(A)	38	45
Outdoor noise level	dB(A)		58	58
<b>Electrical Data</b>				
Power supply			1-220~240V-50HZ	
Voltage Range		V		
Rated current	Cooling	A	8.0	10.1
	Heating	A	7.5	10
Rated input	Cooling	W	1750	2220
	Heating	W	1650	2200
<b>Refrigerating System</b>				
Refrigerant/Charge		Gram	R410A/1400g	R410A/1900g
Compressor	Type		Rotary	Rotary
	Model		----	
	LRA	A	----	
	MFG		----	
Evaporator			Louver fin and grooved tube type ( $\varnothing 7$ )	
Condenser			Corrugated fin and grooved tube type ( $\varnothing 9.52$ )	
Expansion device			Capillary tube	
Defrosting system			Microcomputer controlled reverse system	
<b>Fan System</b>				
Indoor air circulation/Hi Cooling		m <sup>3</sup> /h	800	1100
Indoor fan type			Cross flow	Cross flow
Indoor fan speed H/M/L	Cooling	rpm	1060/970/880	1330/1230/1150
	Heating	rpm	1060/970/880	1330/1230/1150
	Dry	rpm	880	1150
	Sleep	rpm	880	1150
Indoor fan motor output		W	22	35
Outdoor air circulation		m <sup>3</sup> /h	2100	3100
Outdoor fan type			Propeller fan	Propeller fan
Outdoor fan speed		rpm	850	850
Outdoor fan motor output		W	45	76
<b>Connections</b>				
Refrigerant coupling			Flare type	
Connecting Pipe	Gas	Inches	1/2	5/8
	Liquid	Inches	1/4	3/8
Connecting Wiring	Size x Core number			
Drainage Pipe			O.D 16mm	
<b>Others</b>				
Suitable area		m <sup>2</sup>	30~40	35~48
Net dimensions (W x H x D)	Indoor	mm	1033 x 313 x 202	1033 x 313 x 202
	Outdoor	mm	863 x 605 x 376	902 x 650 x 307
Net weight	Indoor	kg	14	14
	Outdoor	kg	42	56
Packing dimensions (W x H x D)	Indoor	mm	1103 x 400 x 300	1103 x 400 x 300
	Outdoor	mm	863 x 605 x 376	1027 x 766 x 433
Gross weight	Indoor	kg	17	17
	Outdoor	kg	46	63
Loading Capacity	40°/40°HC		90/188/218	63/135/157

# Operation Details

## Remote controller

### Remote controller

The remote controller transmits signals to the system.



- 1 ON/OFF button**  
Used to start and stop operation when pressed.
- 2 TIMER button**  
Used to select TIMER operation.
- 3 UP button (TOO COOL button)**  
Used to increase the set room temperature and time.
- 4 DOWN button (TOO WARM button)**  
Used to decrease the set room temperature and time.
- 5 SLEEP button**  
Used to set or cancel sleep mode operation.
- 6 VANE control button**  
Used to adjust airflow direction.
- 7 FAN SPEED control button**  
Used to select the indoor fan motor speed: Auto, High, Mid and Low.
- 8 MODE button**  
Used to select the type of operation mode: Feel, Cooling, Dry, Fan and Heating(Only for Heat Pump).

*Note: Each mode and relevant function will be further specified in following pages.*

### Remote Control

The remote controller is not preset as Cooling Only Air Conditioner or Heat Pump by manufacturer. Each time after the remote controller replace batteries or is energized, the arrowhead will flashes on the front of "Heat" or "Cool" on LCD of the remote controller. User can preset the remote controller type depending on the air conditioner type you have purchased as follows:  
 Press any button when the arrowhead flashes on the front of "Cool", Cooling Only is set.  
 Press any button when the arrowhead flashes on the front of "Heat", Heat Pump is set.  
 If you don't press any button within 10 seconds, the remote controller is preset as Heat Pump automatically.

### Note :

If the air conditioner you purchased is a Cooling Only one, but you preset the remote controller as Heat Pump, it doesn't bring any matter. But if the air conditioner you purchased is a Heat Pump one, and you preset the remote controller as Cooling Only, then you CAN NOT preset the Heating operation with the remote controller.

## REMOTE CONTROLLER

The four types of remote controller is as follow:

### For YKEQ-YCNQ 251~671 GR Models



GYKQ-05



GYKQ-10e



GYKQ-11e



GYKQ-12e

**Note:** The function of remote controller above is the same.

## Electronic Controller

### 1. Safety Control

#### (1) Time Delay Safety Control

- 3 minutes delay for compressor---The compressor is ceased for 3minutes to balance the pressure in the refrigeration cycle in order to protect the compressor.
- 2 minutes delay for 4-way valve---The 4-way valve is ceased for 2 minutes to prevent the refrigerant-gas abnormal noise when the HEATING operation is OFF or switch to the other operation mode.

#### (2) Indoor Pipe Temperature Sensor Frost Prevention Control

When the indoor pipe temperature sensor reads 0 or below for 5 minutes, the indoor pipe temperature sensor frost prevention control starts. The compressor and outdoor fan stop and indoor fan operates at high speed for 3 minutes. After that, if the indoor pipe temperature sensor reads less than 5 this control prolonged until the indoor pipe temperature sensor reads 5 or more.

#### (3) High Temperature Protection Control

During HEATING operation, the outdoor fan motor and compressor are controlled by the indoor pipe temperature to prevent the high temperature of compressor.

Outdoor fan OFF: when the indoor pipe temperature is 50

Outdoor fan ON: when the indoor pipe temperature is 48

Compressor OFF: when the indoor pipe temperature is 62

Compressor ON: when the indoor pipe temperature is 48

### 2. "I Feel" Mode Operation

- (1) When the "I Feel" mode is selected, the operation mode and initial set temperature are determined by the initial room temperature at start-up of the operation except to turn off the air conditioner and operates it again.
- (2) If the mode is change to "I Feel" mode from other mode, the "I Feel" mode doesn't operate until compressor stop for more than 3 minutes.

Mode	Initial room temperature	Initial set temperature
COOLING	26 or more	24
DRY	20 to 25	18
HEATING for Heat Pump Type FAN for Cooling Only Type	Less than 20	23

- In the "I Feel" mode , when the controller receives the up or down single of temperature, the set temperature can adjust by 1 upper or lower. The biggest you can adjust by 2 upper or lower.

### 3. "COOLING" Mode Operation

- (1) When the COOLING mode is selected without setting temperature, the system will set the set temperature at 26 automatically with the AUTO FAN speed.
- (2) When selecting the COOLING mode operation, the system will operate according to the setting by the remote controller and the operation is as following:

Room Temp.					
Set TEMP. + 1					
Set TEMP. - 1					
Time	More than 2 min	More than 2 min	More than 2 min	More than 2 min	More than 2 min
Indoor Fan	Set Speed	Set Speed	Set Speed	Set Speed	Set Speed
Compressor	ON	OFF	ON	OFF	ON
Outdoor Fan	ON	OFF	ON	OFF	ON

**4. “DRY” Mode Operation**

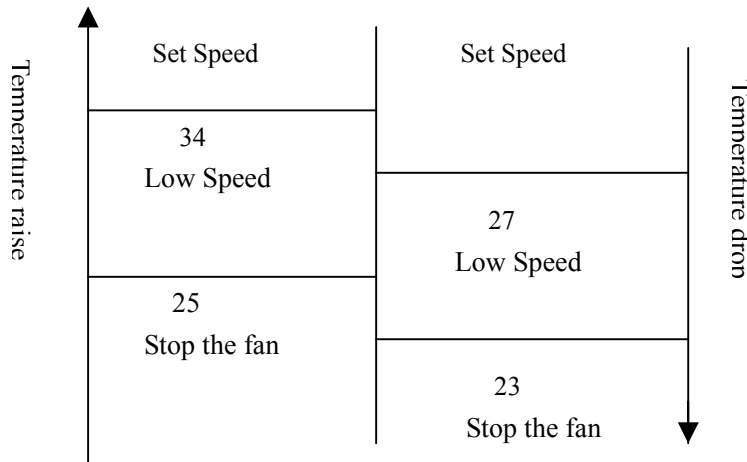
- (1) The system for DRY operation used the same refrigerant circle as the cooling circle.
- (2) When the system operates in DRY mode ,at first it operates in cooling mode at 16 or 18 for 3 minutes. And then, the system operates in cooling mode with low speed that regards the temperature of the room temperature sensor reads decrease 2 as the set temperature. During the course of this, the fan speed set operation is failing but the vane motor can be controlled.

**5. “HEATING” Mode Operation (Only available for Heat Pump)**

- (1) When the HEATING mode is selected without setting temperature, the system will set the temperature at 23 automatically with the AUTO FAN speed.
- (2) When selecting the HEATING mode operation, the system will operate according to the setting by the remote controller and the operation is as following:

Set Temp. + 1					
Set Temp. - 1					
Room Temp.					
Time	More than 2 min	More than 2 min	More than 2 min	More than 2 min	More than 2 min
Compressor	ON	OFF	ON	OFF	ON
Outdoor fan	ON	OFF	ON	OFF	ON

- (3) In HEATING mode, the indoor fan motor speed is controlled by Cold Air Prevention Control.
- (4) Cold Air Prevention Control
  - The function is intend to prevent cold air from being discharged when the heating operation starts or when defrosting.
  - The indoor fan speed will be controlled as following.
  - The vane angle is at the angle C(100 °).



- During the heating operation, if the compressor stops that it will adjust the indoor fan speed, after 30 seconds to stop the fan.

**(5) Defrost**

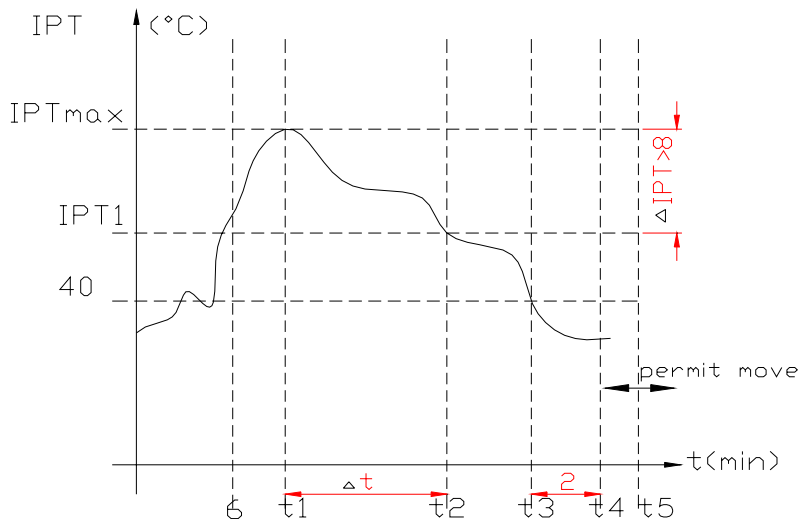
Defrosting of the outdoor heat exchange is controlled by the microprocessor with detection by the indoor pipe temperature sensor.

Defrost control type is according to the JC on the PCB whether is connected.

● **When the JC is connect on the PCB**

When one of the conditions of A, Band C is satisfy, the defrosting operation stars.

**A. IPT---** indoor pipe temperature



In the condition A, it must satisfy the conditions a), b) and c) then into defrosting operation.

- a) IPT1 satisfy  $IPT1 = IPT_{MAX} - IPT ( 8 )$
- b)  $t5 > 50$  minutes (the compressor cumulative operation time  $> 50$  minutes,  $t5$  is permitted move and lower than  $t1$  too).
- c)  $IPT < 40$  , and keep 2 minutes.

According to the condition A enter the defrosting operation, the first defrosting operation time is 8 minutes; After defrosting operation one cycle, and then judge and regulate the defrosting operation time.

**B.** After the compressor cumulative operation time exceeds 120 minutes and the temperature of the IPT is less then 35 for 2 minutes. When the defrosting operation time on this condition exceeds 8 minutes, it will terminate.

**C.** After the compressor operation continuously for 20 minutes and the IPT is less than 23 or from the last time of defrosting operation is 50 minutes or more interval. When the defrosting operation time on this condition exceeds 10 minutes, it will terminal.

● **When the JC isn't connected on the PCB**

When the conditions of a) or b) is satisfy, the defrosting operation starts.

- a) Under the heating operation, the compressor cumulative operation time exceeds 50 minutes and the temperature of the outdoor pipe temperature sensor reads lower than  $- 8$
- b) Under the heating operation, the compressor cumulative operation time exceeds 50 minutes, if the indoor pipe temperature sensor reads lower than 40 continuously for 2 minutes.

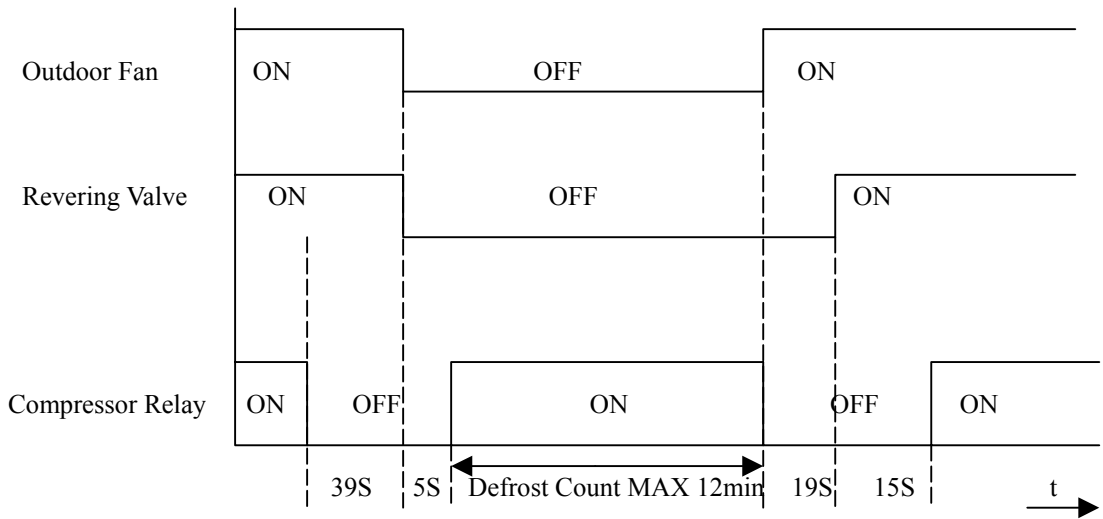
Note: If haven't the outdoor pipe temperature sensor that use the condition b) to defrost, against use the condition a).

● **Defrost terminating conditions**

When the condition c) or d) is satisfy, the defrosting operation will terminal.

- c) The outdoor defrost sensor reads 20 or more.
- d) The defrosting time exceeds 10 minutes.

● **Defrosting time chart**



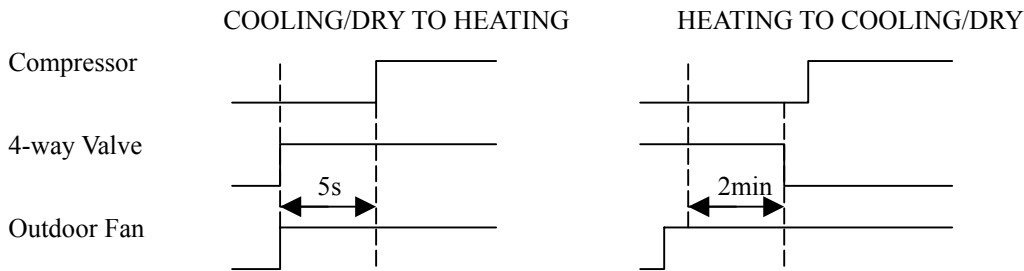
**6. “FAN” mode operation**

The indoor fan motor always turns on at the set speed and the vane motor turns on at the set fettle.

**7. 4-way Valve control**

HEATING                    ON  
 COOLING/DRY            OFF

The 4-way valve reverses for 5 seconds right before start-up of the compressor as following chart:



**8. “SLEEP” mode**

When the SLEEP button is pressed, the SLEEP mode is selected as following:

- The indoor fan speed is set at the low speed, the power lamp and the sleep lamp is on, the temperature off after 5 minutes.
- When selecting COOLING/DRY operation with SLEEP mode, the set temperature will be raised by 1 °C 1 hour later and by 2 °C 2 hour later.
- When selecting HEATING operation with SLEEP mode, the set temperature will be dropped by 1 °C 1 hour later and 2 °C 2hour later.
- After the System operates in SLEEP mode for 8 hours, it will stop automatically.

**9. Fan motor control**

(1) Rotational frequency feedback control

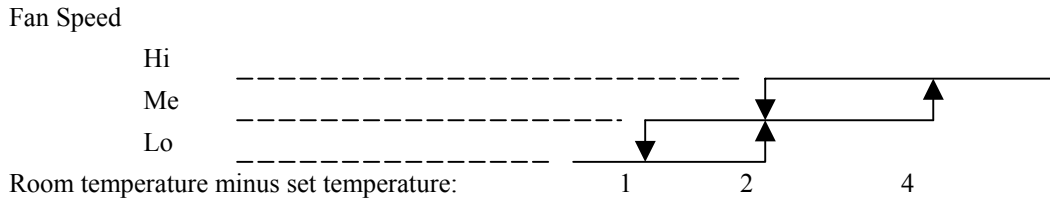
The indoor fan motor is equipped with a rotational frequency sensor, and outputs signal to the microprocessor to feedback the rotational frequency. Comparing the current rotational frequency with the target rotational frequency, the microprocessor adjusts fan motor electric to make the current rotational frequency close to the target rotational frequency. With this control, when the fan speed is switched, the rotational frequency changes smoothly.

- (2) When the rotational frequency feedback signal has not output for 5 seconds (or when the microprocessor can't detect the signal for 5 seconds), the fan motor is regarded locked-up. Then the electric current to the fan

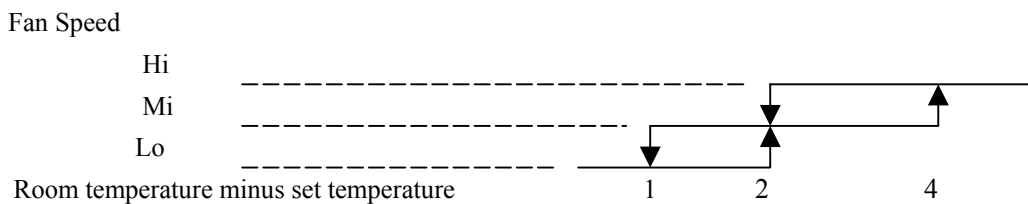
motor is shut off. 10 seconds later, the electric current is applied to the fan motor again. During the fan motor lock-up, the POWER indicator lamp flashes on and off 6times/cycle or E6 to show the fan motor abnormality.

**10. Auto Fan Speed Control**

- (1) When the auto fan speed is selected, the indoor fan motor speed is automatically controlled by the room temperature and the set temperature.
- (2) In COOLING mode, the indoor fan motor operates as following:



- (3) In HEATING mode, the indoor fan motor operates as following;



**11. Auto Vane Operation control**

- (1) Vane motor drive
 

The unit is equipped with a stepping motor for the vane. The rotating direction, speed, and angle of the motor are controlled by pulse signal transmitted from indoor microprocessor.
- (2) Positioning
 

The vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle. The positioning is decided as follows:

  - When the ON/OFF button is pressed.
  - When the vane control is change from AUTO to MANUAL.
  - When the SWING is finished.
  - When the test run starts.
  - When the power supply turns ON.
- (3) The auto vane changes as follows by pressing the VANE CONTROL button.
- (4) VANE AUTO mode
 

In vane auto mode, the microprocessor automatically determines the vane angle and operation to make the optimum room-temperature distribution.
- (5) SWING mode
 

When presses the SWING button, the vane swings.

**12. TIMER Operation**

- (1) To activate the air conditioner at the desire time, follow the procedure specified below(the remote control and air conditioner are switched off):
  - Press the Timer button.
  - Select the desired mode by pressing the Mode button.
  - Select the desired temperature by pressing the ▲ ▼ button(only possible when the ‘cool’ or ‘heat’ mode is selected).
  - Select the ventilator speed (low, medium or high) or automatic mode(only possible when the feel, Cool or Heat mode is selected) by pressing the Fan button.

The ventilator always operates in the Auto mode when the Dry mode is selected.

  - Select Swing or no Swing by pressing the Swing button.

- Press the Timer button('h' flashes).
- Use the ▲▼ button to select the time at which the air conditioner must activate (between 0 and 10 hours can be set at every half hour-between 10 and 24 hours can be set at every hour).
- Press the Timer button ('h' stops flashing) and the preset time appears in the display.
- Press the Timer button again to delete the selected data from the memory.

Note : If no buttons are pressed during the programming of the timer function, the remote control will switch off automatically after 10 seconds.

- (2) To switch the air conditioner off at the desired time, follow the procedure specified below (the remote control and air conditioner are switched off):
- Press the timer button.
  - Use the ▲▼ button to select the time at which.

### 13. EMERGENCY Operation

When the EMERGENCY Operation switch is pressed once, COOLING mode is selected and if in 3 seconds the EMERGENCY Operation switch is pressed again, mode is selected. Then pressed once again, the unit is switched off.

When the remote controller is missing, has failed or the batteries run down, press the EMERGENCY Operation switch on the front of the indoor unit. The unit will start.

The first 30 minutes of operation will be the test run operation. The operation is for servicing. The indoor fan runs at high speed and the system is in continuous operation. The thermostat is ON and the timer is reset to normal.

After 30 minutes of test run operation the system shifts to AUTO COOLING/HEATING mode, and the indoor fan runs in automatic speed. The operation continues until the EMERGENCY operation switch is pressed or a button on the remote controller is pressed, the normal operation will start.

NOTE: Do not press the EMERGENCY Operation switch during normal operation.

### 14. AUTO RESTART Function(Optional)

1. When the indoor unit is controlled with the remote controller, the operation mode, set temperature, and the fan speed are memorized by the indoor electric control PCB. The AUTO RESTART function sets to work the moment power has restored after power failure. Then, the unit will restart automatically.

2. How to set the AUTO RESTART function.

- Press the emergency switch and power supply to the PCB following, keep 10 seconds and the buzzer will beep three times. The AUTO-RESTART is set.
- Do the operation again, the buzzer will beep four times and the AUTO-RESTART function is cancelled.

### 15. Failure Display and Handling

#### a) Failure Display

When the controller is failure, the buzzer will voice long for three times, and displays the failure from the failure lamp.

#### b) Failure Code

If have the digital pipe that display the failure code for digital pipe, or display for the run lamp.

Type of failure	The lamp flash	Display of digital pipe
The failure of room temperature sensor	Once/cycle	E1
The failure of indoor pipe temperature sensor	Twice/cycle	E2
The failure of indoor fan motor	6 times/cycle	E6

#### c) Failure Handling

- When the room temperature sensor or the indoor pipe temperature sensor is failure, the system will be shut off, the compressor will be OFF, and the outdoor fan and the indoor fan will be OFF. The system doesn't receive the signal of remote controller except the signal of shut off it. When the failure disappear, the controller can operate in normal mode. before this, presses the "ON/OFF" to start the system, and it will operate in COOLING or HEATING for 30 minutes, and follows shut off. During

this, it displays the failure and the protection is failing. You must be given the electric again to operate it. In the failure, you can operate the FAN mode.

- When the outdoor protects in the COOLING or DRY, the outdoor unit stops, the indoor fan operates in set speed ; and in the HEATING, the outdoor unit stops, the indoor fan operates in cold air prevention control. The system doesn't receive the signal of remoter controller except the signal of shut off it. When the system check the voltage is 220V and the delay control is finished, it operates at normal again.
- When the indoor fan motor is failure, the compressor is stopped, the outdoor fan and indoor fan is stopped and display the failure. The system doesn't receive the signal of remoter controller except the signal of shut off it.

d) Display Of The Control

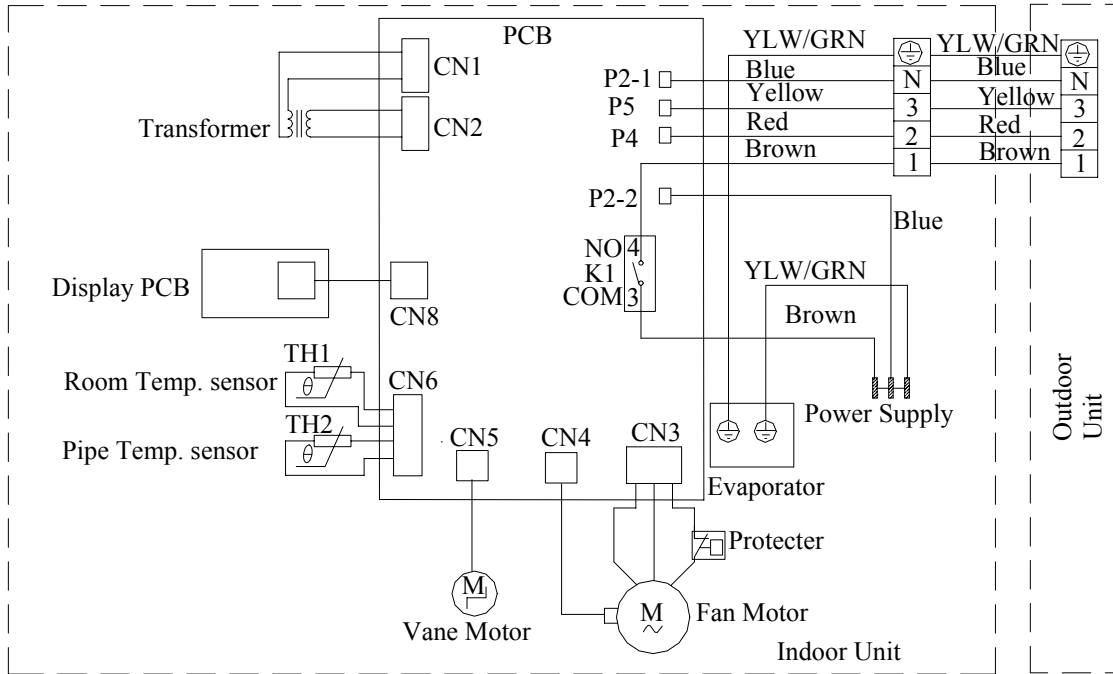
In the display board the lamp from left is the POWER lamp(Red), the SLEEP lamp(Yellow), the TIMER lamp(Yellow), the RUN lamp(Green).

g) When gives the control electric, the buzzer voices a long for 0.3 second per cycle.

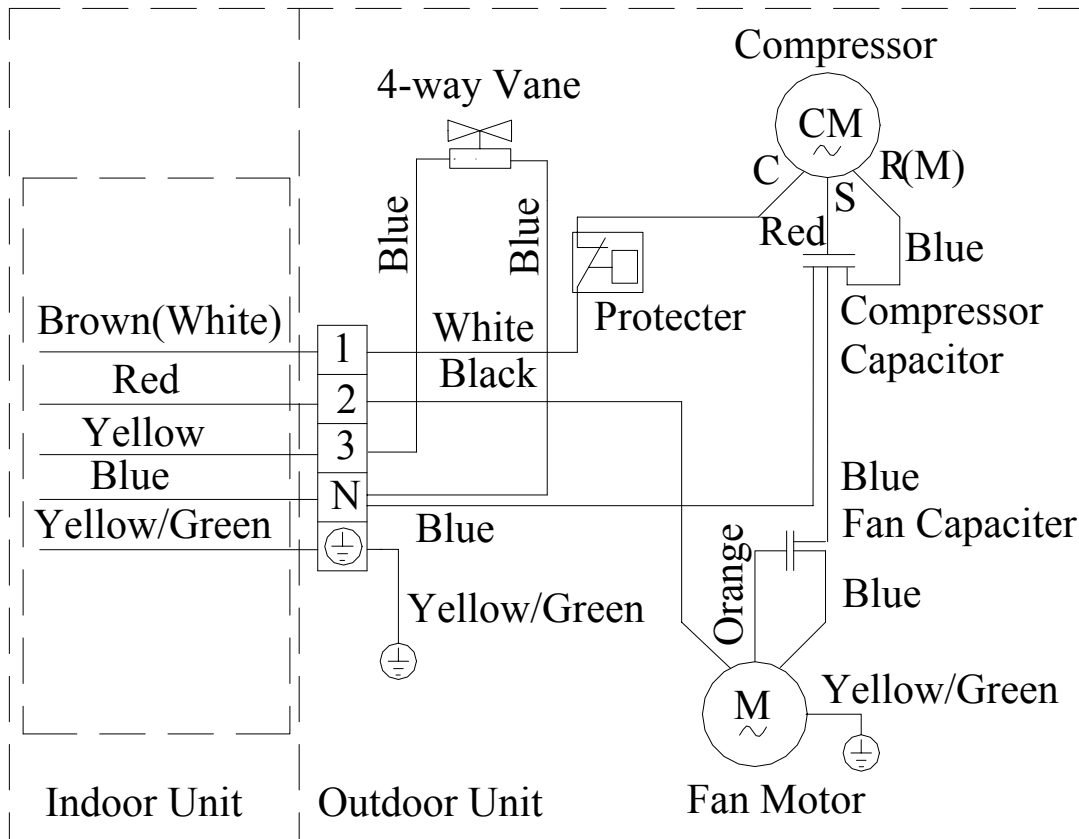
# WIRING DIAGRAM

MODELS: YKEQ-YCNQ 251, 331 GR

INDOOR UNIT:



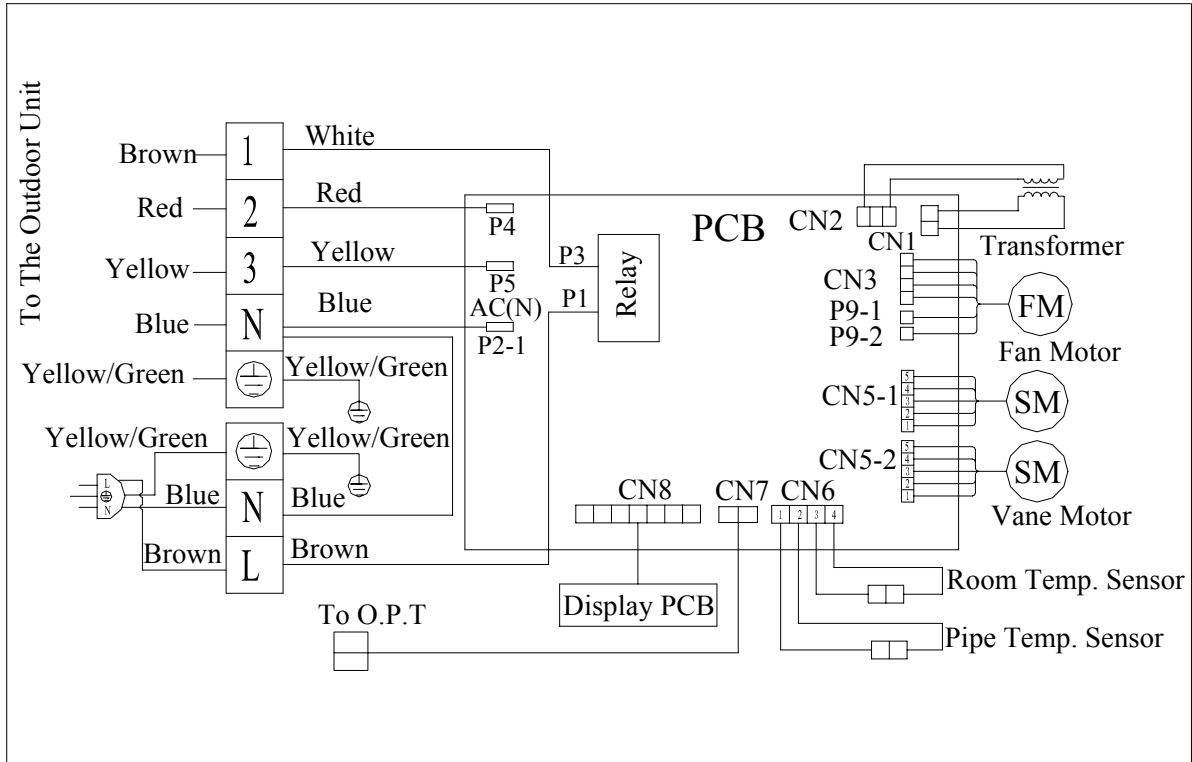
OUTDOOR UNIT



## WIRING DIAGRAM

MODEL: YKEQ-YCNQ 531 GR

INDOOR UNIT:



OUTDOOR UNIT:

