

CONTENTS

1. WINDOW TYPE	2
■ SPECIFICATION	3
■ OPERATION MODES AND FUNCTIONS	4
■ WIRING DIAGRAM	22
2. WALL-MOUNTED SPLIT TYPE	3
■ SPECIFICATION	3
■ OPERATION MODES AND FUNCTIONS	4
■ WIRING DIAGRAM	22
3. FLOOR STANDING TYPE	
■ SPECIFICATION	3
■ MICRO ELECTRICAL CONTROL SYSTEM	4
■ WIRING DIAGRAM	22
4. REFRIGERANT FLOW CHART	
■ COOLING	
■ COOLING & HEAT	
■ MAXIMUM LENGTH OF REFRIGERANT PIPE	
5. MICROPROCESSOR CONTROL	
■ MICRO PROCESSOR CONTROL	
■ ELECTRIC CONTROL SECTION	

1. Main Parts Introduction

1.1 Compressor

- ① The compressor, which is controlled by contactor, will in turn make it act through relay when Main chip output is high level.
- ② Auxiliary start-up function: when the compressor starts up with single phrase, the main chip

Output will be in high level. 4 seconds after start-up circuit is engaged, the main chip output will be in low level and the start-up circuit will shut down.

- ③ The compressor will remain operation when defrosting ends.

1.2 Indoor Fan

The motor is a tapping motor with iron-made outer cover and high, low and fine tuning speed selections. Driven by three relays separately. The main chip will act when its output is high level. Under any circumstances, only one fan speed is allowed.

1.3 Outdoor Fan

The motor is a tapping motor with iron-made outer cover and high, low speed options controlled by relays separately. The main chip acts when its output is high level.

1.4 Buzzer

- ① It will buzz when its driving port in the main chip outputs high level.
- ② It will buzz twice with each lasting 0.5 second at 0.5 intervals when the main frame receives remote start-up signal.
- ③ It will buzz once for 1 second when receiving turn-off signal.
- ④ It will buzz for 0.5 second once receiving other signal.
- ⑤ It will not buzz when receiving abnormal signal.

1.5 Indicator

- ① There are 4 indicators: operating indicator, water level warning indicator, defrosting indicator and pre-heating indicator(wind-delivery indicator for cooling-only A/C)
- ② The light-emitting diode driven by the main chip will light when the level is low.
- ③ LED indicates errors when protection is in effective.

1.6 Four-way Valve

It is controlled by relays. The main chip acts when output is high level.

1.7 Heating Condition for Crankcase

The crankcase will be heated when the temperature of the outer pipe is below 7°C and the compressor is off.

The crankcase will no longer be heated when the temperature of the outer pipe is over 15°C.

The crankcase will no longer be heated when the compressor is on.

1.8 Condensate Pump

It is controlled by relays. The main chip acts when it outputs high level.

WINDOW TYPE

MODEL:

TA-05CW; TA-07CW; TA-09CW; TA-11CW; TA-12CW;

TA-15CW; TA-16CW; TA-18CW; TA-24CW

Features

1. Compact design and elegant appearance.
2. Mechanical control or remote control is optional.
3. Quiet operation, powerful cooling and mild dehumidifying.
4. 2 step fan speed adjustable, auto swing function and all direction airflow distribution.
5. Equipped with world famous rotary compressor and heat exchanger made by inner-grooved copper tube and hydrophilic aluminum fins, high efficiency and energy saving.
6. Detachable front panel and air filter, easy to clean.
7. Three minute restart delay protection.
8. Freon-free refrigerant R407c is adopted for environmental protection.

Part 1. Specification

Model	TA-05CW	TA-07CW	TA-09CW	TA-11CW	TA-12CW
Series					

Power supply		Ph-V-Hz	220V50Hz	220V50Hz	220V50Hz	220V50Hz	220V50Hz
cooling	Capacity	Btu/h	5000	7000	9000	11000	12000
	Input	W	600	770	960	1250	1350
	Rated current	A	2.8	3.7	4.5	5.9	6.4
	EER	Btu/w.h	8.3	9.1	9.4	8.8	8.9
Heating	Capacity	Btu/h	/	/	/	/	/
	Input	W	/	/	/	/	/
	Rated current	A	/	/	/	/	/
	Cop	w/w	/	/	/	/	/
Electric heater	Capacity	Btu/h	/	/	/		
	Input	W	/	/	/		
	Rated current	A	/	/	/		
	Cop	w/w	/	/	/		
Moisture Removal		L/h	0.5	0.6	1.1	1.2	1.3
Max. input consumption		W	780	1000	1250	1500	1760
Max. input Current		A	4.1	5.3	6.5	8.6	9.2
Air flow		m ³ /h	310	320	350	400	420
Noise level (Maximum)		dB(A)	47	50	50	52	52
Net weight		Kg	21	36	36	46	46
Grass weight		Kg	23	38	38	50	50
Refrigerant type/Quantity	R22	g	380	700	700	800	820
	R407C	g	380	700	700	800	820
Suction pressure		Mpa	1.2	1.2	1.2	1.2	1.2
Discharge pressure		Mpa	2.8	2.8	2.8	2.8	2.8
Dimension	Width	mm	470	445	445	560	560
	Depth	mm	350	605	605	650	650
	Height	mm	310	350	350	400	400
Packing	Width	mm	565	705	705	735	735
	Depth	mm	456	540	540	630	630
	Height	mm	450	410	410	505	505
Shockproof Class			I	I	I	I	I
Waterproof Class			IPX4	IPX4	IPX4	IPX4	IPX4
Application area		m ²					

Model		TA-15CW	TA-16CW	TA-18CW	TA-24CW	
Series						
Power supply		Ph-V-Hz	220V50Hz	220V50Hz	220V50Hz	
cooling	Capacity	Btu/h	15000	16000	18000	24000
	Input	W	1760	2000	2200	2960

	Rated current	A	8.2	9.2	10.2	13.6
	EER	Btu/w.h	8.5	8	8.2	8.2
Heating	Capacity	Btu/h		/	/	/
	Input	W		/	/	/
	Rated current	A		/	/	/
	Cop	w/w		/	/	/
Electric heater	Capacity	Btu/h		/	/	/
	Input	W		/	/	/
	Rated current	A		/	/	/
	Cop	w/w		/	/	/
Moisture Removal		L/h	1.34	1.36	1.42	1.42
Max. input consumption		W	2530	2880	3170	4260
Max. input Current		A	11.8	13.2	14.7	19.6
Air flow		m ³ /h	650	700	740	950
Noise level (Maximum)		dB(A)	54	56	56	57
Net weight		Kg	56	56	58	58
Gross weight		Kg	60	60	62	62
Refrigerant type/Quantity	R22	g	1080	1150	1300	1730
	R407C	g	1040	1110	1250	1660
Suction pressure		Mpa	1.2	1.2	1.2	1.2
Discharge pressure		Mpa	2.8	2.8	2.8	2.8
Dimension	Width	mm	705	705	705	705
	Depth	mm	670	670	670	670
	Height	mm	455	455	455	455
Packing	Width	mm	760	760	760	760
	Depth	mm	732	732	732	732
	Height	mm	490	490	490	490
Shockproof Class			I	I	I	I
Waterproof Class			IPX4	IPX4	IPX4	IPX4
Application area		m ²				

Part 2. Operation Modes and Functions

1. Working Conditions:

Mode	Cooling	Heating	dehumidification
------	---------	---------	------------------

Temperature	Indoor	18°C—32°C	-7°C—30°C	18°C—32°C
	Outdoor	18°C—43°C	/	13°C—43°C

Note: 1. Exceeding the above temperature, protective function is out of work.
2. If cooling operation is under the quite humid conditions, the surface of indoor unit will become condensed and will drop water. Please adjust to maximum outlet position from the vertical deflector and select “High Fan”.

2. Operation:

2.1 Control panel

- 1) Press the top of control to open it so that you use function knob
- 2) Close the panel and press the top of it, make sure you have close it correctly.

Note: TA-05CW don't have control panel.

2.2 Function introduction

- (1) “High Fan” button is selected, the fan motor operates with high speed and sends out the strong wind.
- (2) “Low Fan” button is selected, the fan motor operates with low speed and sends out the breeze wind.
- (3) “Mid Fan” button is selected, the fan motor operates with mid speed and sends out the mid wind.
- (4) “High Cool” button is selected, the air conditioner is cooling quickly and sends out the strong cool wind.
- (5) “Low Cool” button is selected, the air conditioner is cooling at mid speed and sends out the mid cold wind.
- (6) “Mid Cool” button is selected, the air conditioner is cooling quickly and sends out the less cold wind.
- (7) “Off” button is selected, the air conditioner stops.

Note: When choose “High Fan”, “Mid fan” or “Low Fan”, the air conditioner only sends out wind, not cooling.

Note: When “Low Cool” is turned to “High Cool”, the speed should be lower and do not switch.

Note: 3 Minutes interval for restarting the operation.

Note: Only TA-05CW has “Mid fan” and “Mid cool” functions.

Part 3. Wiring diagram

1. TA-05CW

MODEL:

TA-05C(H)S; TA-07C(H)S; TA-09C(H)S; TA-12C(H)S;
TA-15C(H)S; TA-16C(H)S; TA-18C(H)S; TA-24C(H)S

Features

Toyo split type wall-mounted air conditioner have A, B, B1, B2, F1, F2, F3, H, K1, K2, 1B series.

1. Compact design and elegant appearance.
2. Mechanical control or remote control is optional.
3. Quiet operation, powerful cooling and mild dehumidifying.
4. 2 step fan speed adjustable, auto swing function and all direction airflow distribution.
5. Equipped with world famous rotary compressor and heat exchanger made by inner-grooved copper tube and hydrophilic aluminum fins, high efficiency and energy saving.
7. Detachable front panel and air filter, easy to clean.
8. Three minute restart delay protection.
9. Freon-free refrigerant R407c is adopted for environmental protection.

Part 1. Specification

Model	TA-07C(H)S	TA-09C(H)S	TA-12C(H)S	TA-16C(H)S
--------------	-------------------	-------------------	-------------------	-------------------

Power supply		Ph-V-Hz	220V50Hz	220V50Hz	220V50Hz	220V50Hz
cooling	Capacity	Btu/h	7000	9000	12000	16000
	Input	W	770	930	1400	1620
	Rated current	A	3.5	4.3	6.4	8.2
	EER	Btu/w.h	9.1	9.7		
Heating	Capacity	Btu/h	7500	9000	13000	16100
	Input	W	750	940	1310	1600
	Rated current	A	3.4	4.25	6.0	7.6
	Cop	w/w	10			
Moisture Removall (Hi/Mi/Lo)		L/h	0.6	0.84	1.0	1.22
Max. input consumption		W	920	1220	1820	2010
Max. input current			4.8	6.2	9.5	10
Indoor air flow		m ³ /h	350	440	520	660
Indoor noise leve		dB(A)	39	40	39	42
Indoor Dimension	Width	mm	745	745	790	
	Depth	mm	175	250	288	
	Height	mm	250	199	240	
Indoor packing	Width	mm	810	810	856	1050
	Depth	mm	242	320	342	367
	Height	mm	320	242	290	246
Indoor net weight		Kg	8	8	8.5	14
Indoor gross weight		Kg	11	11	11	17
Outdoor noise level		dB(A)	49	46	50	50
Outdoor Dimension	Width	mm	700	700	798	
	Depth	mm	270	270	260	
	Height	mm	545	545	528	
Outdoor packing	Width	mm	768	768	922	924
	Depth	mm	334	334	322	324
	Height	mm	590	590	592	592
Outdoor net weight		Kg	29	29	33	39
Outdoor net weight		Kg	33	33	37	44
Refrigerant type/Quantity	R22	g	720	740	950	1200
	R407	g	720	740	950	1200
Shockproof Class			I	I	I	I
Waterproof Class			IPX4	IPX4	IPX4	IPX4
Application area		m ²	16	20	22	26

Model		TA-18C(H)S	TA-24C(H)S		
Power supply		Ph-V-Hz	220V50Hz	220V50Hz	
cooling	Capacity	Btu/h	18000	24000	
	Input	W	2200	2700	

	Rated current	A	10.1	12.6		
	EER	Btu/w.h				
Heating	Capacity	Btu/h	19000	25000		
	Input	W	2190	2760		
	Rated current	A	10.0	12.9		
	Cop	w/w				
Moisture Removall (Hi/Mi/Lo)		L/h	1.38	1.77		
Max. input consumption		W	2700	3510		
Max. input current			13.8	18.3		
Indoor air flow		m ³ /h	720	920		
Indoor noise leve		dB(A)	42	45		
Indoor Dimension	Width	mm	790	840		
	Depth	mm	288	305		
	Height	mm	240	238		
Indoor packing	Width	mm	856	906		
	Depth	mm	342	375		
	Height	mm	290	31.7		
Indoor net weight		Kg	8.5	18		
Indoor gross weight		Kg	11	21		
Outdoor noise level		dB(A)	50	52		
Outdoor Dimension	Width	mm	798	798		
	Depth	mm	260	260		
	Height	mm	528	528		
Outdoor packing	Width	mm	924	959		
	Depth	mm	322	392		
	Height	mm	592	757		
Outdoor net weight		Kg	44	69		
Outdoor net weight		Kg	52	79		
Refrigerant type/Quantity	R22	g	1500	2200		
	R407	g	1500	2200		
Shockproof Class			I	I	I	I
Waterproof Class			IPX4	IPX4		
Application area		m ²	30	36		

Part 2. Operation Modes and Functions

—. Cooling Mode

1. Set temperature:18-30 °C

2. Compressor and indoor fan action:

Ts = set temperature Ta= room temperature T=Ta -Ts

T	Compressor	Indoor fan		
$T \geq 1^{\circ}\text{C}$	On	High flow	middle flow	Low flow
$T \leq -1^{\circ}\text{C}$	Off	High flow	Low flow	

3. Indoor fan action

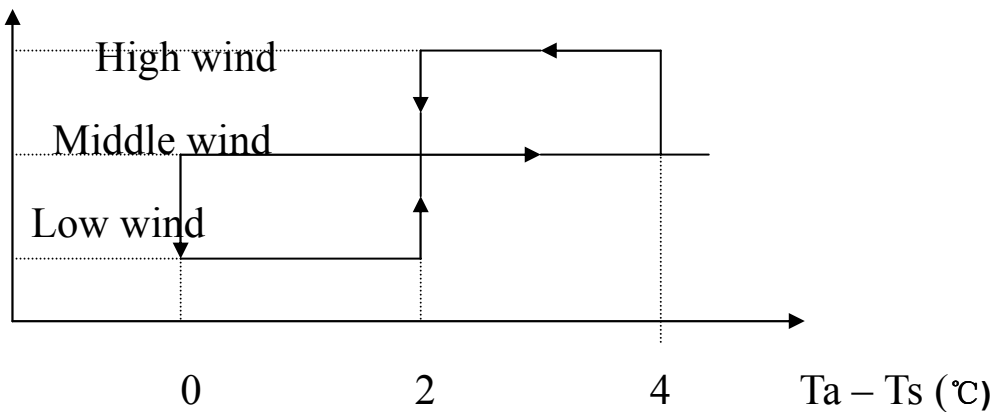
3.1 Fan speed in cooling mode:

- 1) High Flow Selected — Strong Wind sent out
- 2) Middle Flow Selected — Middle Wind sent out
- 3) Low Flow Selected — Breeze Wind sent out

3.2 Fan speed in auto mode:

- 1) $T_a - T_s \geq 4^{\circ}\text{C}$, It will be in high Flow.
- 2) $T_a - T_s \leq 0^{\circ}\text{C}$, It will be in low Flow.
- 3) $T_a - T_s = 2^{\circ}\text{C}$, It will be in middle Flow.

3.3 When $0^{\circ}\text{C} \leq T_a - T_s \leq 4^{\circ}\text{C}$, indoor fan works as following chart:



4. Indoor fan motor speed:

Strong: 1320 r/min High: 1260 r/min Middle: 1150 r/min
 Low: 960 r/min Breeze: 600 r/min Economic: 840 r/min

Remarks: Different models maybe be different about fan motor speed. The speed is for reference only.

5. Continued working function in Cooling Mode:

When Ts is less than 18°C or more than 30°C, “CONT” is shown on remote control, and the air conditioner works in continued working mode.

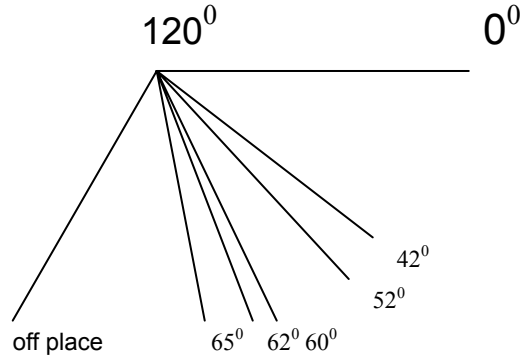
- 1) Compressor works in cooling mode automatically.
- 2) When “AUTO” fan speed is selected, indoor fan speed works in middle flow mode.
- 3) Air flow direction can be adjusted by remote control in natural flow, swing or fix mode.

6. Swing louver action in Cooling Mode:

6.1 Natural flow

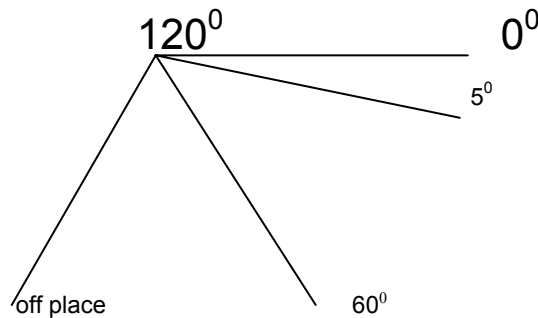
Swing louver direction is as following chart:

swing two girths — stop for 1 minute — swing two girths — stop for 1 minute



6.2 Swing

If swing louver swings up and down, swing range is about 55°.



6.3 When swing louver is under swing mode, press “AIR FLOW” button by the remote controller and the swing louver will stop in the direction where it is.

6.4 When the unit is in cooling mode, the swing louver’s working is independent with compressor’s working.

7. Preventing Indoor coil frost in cooling mode:

- 1) Indoor coil temperature is $\leq 1^{\circ}\text{C}$, and the compressor has been in working for 6 minutes already, turn off compressor, and indoor fan motor changes into low flow mode.
- 2) Indoor coil temperature is $\geq 8^{\circ}\text{C}$, and the compressor has already been off more than 3 minutes, restart the compressor, indoor fan motor works as it is set.

8. Compressor and outdoor fan control (Ta = room temp. Ts = set temp.)

When $T_a - T_s$ is equal or higher than 1°C and the compressor is fulfilled the condition of 3 minutes delay, outdoor fan motor starts first for 5 minutes, and then compressor starts; when $T_s - T_a$ is equal or higher than 1°C , the compressor stops, outdoor fan motor will stop after working for 20 seconds, and can be restarted after 3 minutes.

9. Economic mode in Cooling Mode

- 1) When it is in economic mode in cooling mode, the set temperature will rise 2°C automatically.
- 2) When it is in economic mode in cooling mode, the indoor fan will work in low flow mode.

10. Super wattage function in Cooling Mode

- 1) When it is in super wattage mode, the compressor and outdoor fan motor are on all the time, the indoor fan motor will work in high flow mode.
- 2) When it is in super wattage mode, the super wattage indicator is on, 15 minutes later, this function will be cancelled automatically and the indicator will be off.
- 3) The function fulfils preventing indoor coil frost and outdoor unit working unnormally.
- 4) Super wattage function can be set under TIMER mode, if it is the set time, the function starts automatically, and 15 minutes later will be cancelled automatically.

二. Dehumidifying mode

1. Set temperature: 18 – 30°C

2. First usage of dehumidifying mode, the indoor fan motor will works in low flow mode for 20 seconds, and begin to work relative to the room temperature.

Four working period: (Ta = room temp. Ts = set temp.)

A : Ta > Ts + 3°C

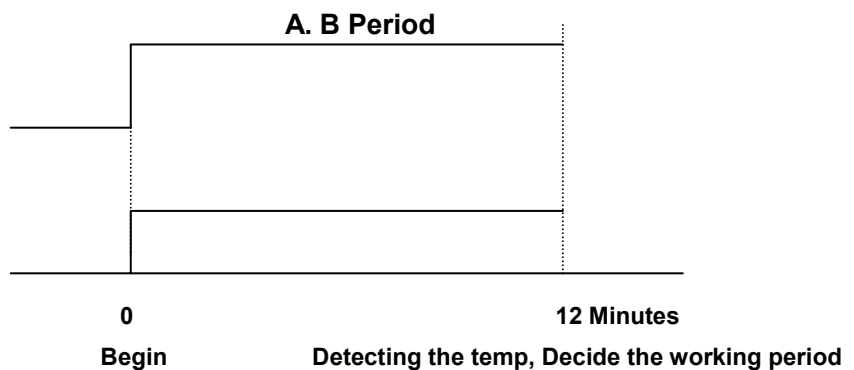
B : Ts + 3°C ≥ Ta > Ts

C : Ts ≥ Ta > Ts - 2°C

D : Ts - 2°C ≥ Ta

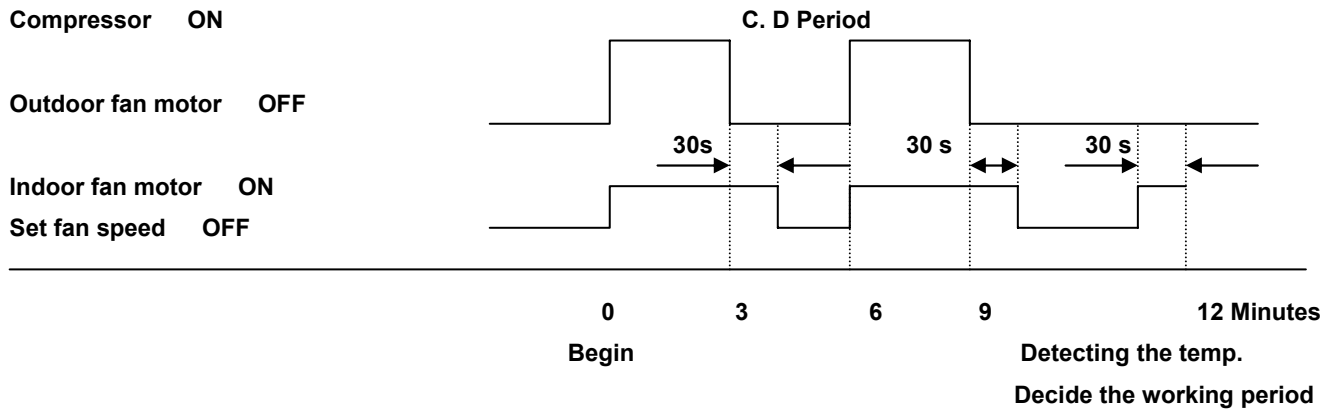
1. Begin to operate

Compressor ON
 Outdoor fan motor OFF
 Indoor fan motor ON
 Set fan speed OFF



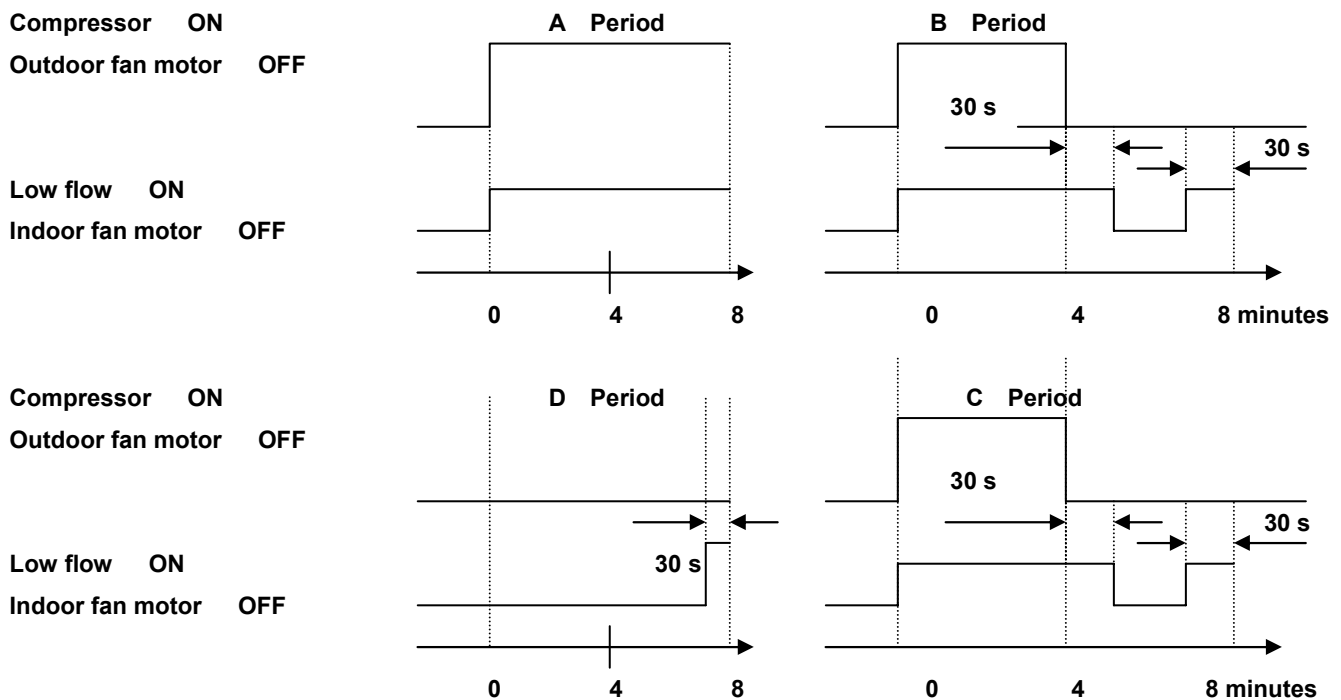
At the first 12 minutes, the working mode is the same as the cooling mode, the compressor stops when the Ta = Ts – 1, when the room temperature rises to Ts, the compressor restarts.

- 1) When Ta > Ts (A. B period), the unit works in cooling mode for 12 minutes, decide working period with the Ta.
- 2) If the Ta ≤ Ts (C. D period), the compressor and the indoor fan motor works in low flow mode for 3 minutes, and then the compressor stops for 3 minutes, indoor fan motor stop after 30 seconds. Repeat the above procedure and go into dehumidifying mode.



2. Dehumidifying function:

As following chart, dehumidifying function begin a circle every 8 minutes, after continuing 7 circles, go back to “3. Begin to operation”, and begin a new circle.



Continued working function in Dehumidifying Mode:

Continued Dehumidifying mode function (CONT) is similar as the Continued Cooling mode (when indoor fan motor is set as AUTO or HI, the unit will change from Middle flow mode into Low flow mode after 12 minutes).

三. Fan mode

1. Set temperature: 18 - 30°C

2. The compressor is off under the fan mode.

3. Whether the indoor fan motor works or not is decided by ΔT ($\Delta T = T_a - T_s$)

- 1) When $T_a \geq T_s + 2^\circ\text{C}$, indoor fan motor runs.
- 2) When $T_a \leq T_s$, indoor fan motor stops.

4. Indoor fan action:

- 1) AUTO
 $T_a > T_s + 2^\circ\text{C}$, middle flow;
 $T_s < T_a \leq T_s + 2^\circ\text{C}$, low flow;
 $T_a \leq T_s$, indoor fan stops.
- 2) When the remote control is set as HI, the indoor fan motor works in high flow mode.
- 3) When the remote control is set as LO, the indoor fan motor works in low flow mode.

5. Continued working function in Fan Mode:

- 1) Independent with the T_a and T_s , send out flow forcibly.
- 2) When the remote control is set as AUTO or HI mode, the indoor fan motor works in middle flow mode or high flow mode, when the remote control is set as LO mode, the indoor fan motor works in low flow mode.

6. Swing louver action in Fan Mode:

The procedure is similar with the working procedure in Cooling Mode, but if the indoor fan motor stops, the swing louver stops, too.

四. Heat mode

1. Set temperature: 18 - 30°C

2. Anti-cold wind function:

The compressor is on, within 90 seconds, the indoor fan motor works as following chart, after 90 seconds, the indoor fan motor works as set fan speed.

Indoor coil temperature								
	25	27	28	30	33	37	47	55
Temperature Up	Stop		Breeze	Low flow	Set flow	High flow		
Temperature Down	Stop	Breeze		Low flow	Set flow	High flow		

3. Compressor, indoor fan motor, reversing valve action:

- 1) when $T_a \leq T_s + 1^\circ\text{C}$, the compressor, outdoor fan motor, and the reversing valve connects.
- 2) When $T_a \geq T_s + 1^\circ\text{C}$, the compressor, outdoor fan motor stop, and the reversing valve will be power off after 2 minutes.

4. Reversing valve control

The reversing valve is power on 30 seconds prior to the compressor, and power off 2 minutes delay after the compressor.

5. Compressor and outdoor fan motor control

- 1) when $T_a \leq T_s + 1^\circ\text{C}$, outdoor fan motor starts firstly for 5 seconds, and then the compressor starts;
- 2) When $T_a \geq T_s + 1^\circ\text{C}$, the compressor stops, outdoor fan motor stops after 20 seconds' delay, and there must be 3 minutes interval before the compressor restarts.

6. Indoor fan motor action:

In heating mode, indoor fan motor can be set as AUTO,HI,MID,LO modes.

7. Continued working function in Heat Mode:

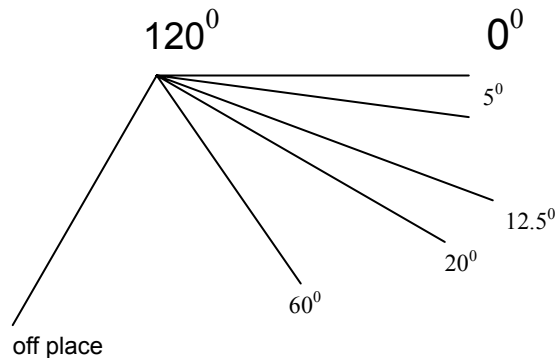
When T_s is lower than 18°C or higher than 30°C , "CONT" is shown on remote control, the unit goes into continued working period.

- 1) The compressor and outdoor fan motor runs, the reversing valve is connecting, heating forcibly.
- 2) When the remote control is set as AUTO or HI, indoor fan motor works in high flow mode, When the remote control is set as LO, the indoor fan motor works in low flow mode.
- 3) Air flow direction can be adjusted by remote control in natural flow, swing or fix mode.

8. Swing louver action in Heating Mode:

1) Natural flow

swing two girths — stop for 3 minute 52 seconds — swing two girths — stop for 3 minute 52 seconds



2) Swing

The swing louver swings up and down, swing range is about 55°.

3) When swing louver is under swing mode, press “AIR FLOW” button and the swing louver will stop in the direction where it is.

4) When the unit is in heating mode, the swing louver’s working is independent with compressor’s working.

9. Auto defrosting function in Heating mode:

4.1 During heating mode, the compressor have been working for a period, if the controller indicate that the outdoor coil is frosting, then auto defrosting function start.

4.2 Only the compressor should have worked for 5 minutes, and totally worked for 50 minutes, does the auto defrosting function work.

3) When this function begins, the compressor and indoor fan are off, the reversing valve is on; outdoor fan will be off after 1 minute’s working, and the reversing valve will be off after 30 seconds, and then the compressor will be on. The compressor works for 8 minutes, and the auto defrosting period ends. The compressor stops and outdoor fan runs. After 1 minute, the reversing valve is on, after 30 seconds, the compressor and indoor fan will be on, and indoor fan work as anti-cold wind mode.

In this action, the indicator light will light (light for 1.5 second, off for 0.5 second)

10. Over heat of the indoor coil protecting in Heating mode:

1) When the temperature of the indoor coil is equal 55 the temperature of the indoor coil is equal 55°C, no matter what Ta is, indoor fan changes to high flow mode, and the outdoor fan will be off, The outdoor fan will not be on until the temperature reduce to 48°C.

2) When the temperature of the indoor coil is equal or higher than 68°C, the compressor and the outdoor fan stop, indoor fan still works in high flow mode.

3) When the temperature of the indoor coil reduce to 50°C, the unit are allowed to work in heating mode.

11. Economic function in Heating mode:

1) When it is in economic mode in heating mode, the set temperature will reduce 2°C automatically.

2) When it is in economic mode in heating mode, the indoor fan will work in low flow mode.

12. Super wattage function in Heating Mode

1) When it is in super wattage mode, the compressor and outdoor fan and the reversing valve are on all the time.

2) When it is in super wattage mode, the super wattage indicator is on, 15 minutes later, this indicator will be off.

3) When it is in super wattage mode, outdoor fan works in high flow mode.

4) Super wattage function can be set under TIMER mode, if it is the set time, the function starts automatically, and 15 minutes later will cancel automatically.

5) When it is in super wattage mode, the over heat protecting function is on.

五. Auto select mode

1. When the unit is in auto select mode, indoor fan will work for 20 seconds in low flow mode, and then decide the working mode with the room temperature, and will not change the mode again.
2. When the unit is in auto select mode, DRY, COOL, HEAT modes can be choose,.
 - 1) When Ta is equal or higher than 27°C, choose COOL, the set temperature is 26°C.
 - 2) When Ta is higher than 21°C and lower than 27°C, choose DRY, the set temperature is 25°C.
 - 3) When Ta is lower than 21°C, choose Heat, the set temperature is 24°C.
3. When the unit is in auto select mode, the up and down button can be used to adjust the set Temperature. The standard set temperature range: Ts - 6°C, Ts + 6°C.

六. On-Timer mode

1. The set time is within 24 hours.
2. When set on-timer function in operation period (the green LED indicator is on), the unit will shut down at once, and the on-timer LED indicator is on.
3. Comfortable on-timer function is efficient in COOL mode, including cooling in auto mode. 1 hour before the auto-run time, detect the room temperature automatically, decide when to run with the difference between the room temperature and the set temperature.

Ta-Ts	Ahead of time
0-2°C	5 minutes
2-10°C	15 minutes
11-15°C	30 minutes
> 15°C	60 minutes

七. LED display

1. When the unit is switched on, the green LED is on., and green LED will be off when the unit is off.
2. On-timer function period, on-timer LED (yellow LED) lights, when the time reaches, the LED is off.
3. Under any operation mode. When there is something wrong with the indoor temperature sensor & coil temperature sensor, the failure can be indicate by

yellow & green light as showed in below form. (self diagnosis function).

Failure	Yellow indicator	Green indicator
Indoor coil temp. sensor	Light	Flash once/8 seconds
Indoor temp. sensor	Light	Flash twice/8 seconds
Outdoor unit abnormal	Flash 5 times/8 seconds	Light
Frosting prevent	Flash 4 times/8 seconds	Light

Note: The compressor have been working for 10 minutes, if $T_a - T_c \leq 3^\circ\text{C}$, and continue for 20 seconds, then decide the outdoor unit is abnormal, the compressor stop, and green LED lights, yellow LED flash. (Tc is

coil temperature.)

八. Sleep mode

1. 1, 2, 3, 5, 7 or 10 hours can be set in sleep mode.
2. Sleep mode in cooling or dehumidifying mode, the set temperature will rise 0.5°C automatically, and rise 0.5°C every 30 minutes, a total rise of 1.5°C within 1 hour.

九. Emergency

When only the controller has failed but the others are normal, the air conditioner can also work by emergency switch. automatically choose the low airflow supply and run for 30 seconds first, then identify the most suitable operation mode, such as cooling, dehumidifying or heating, etc.

十. Self diagnosis function

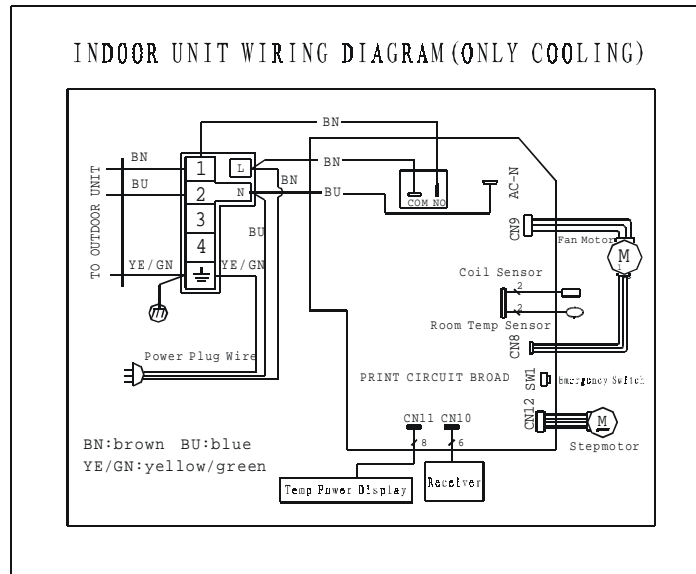
If the air conditioner starts work from the emergency button, the unit goes into the self diagnosis period.

The buzzer will buzz once, and the indoor fan runs, all the lighting tubes light, after 2 seconds, the lighting tubes are off and outdoor fan runs, 2 seconds later, outdoor fan is off, the reversing valve start working, 2 seconds later, the reversing valve is off, the compressor runs, 2 seconds later the indoor fan is off.

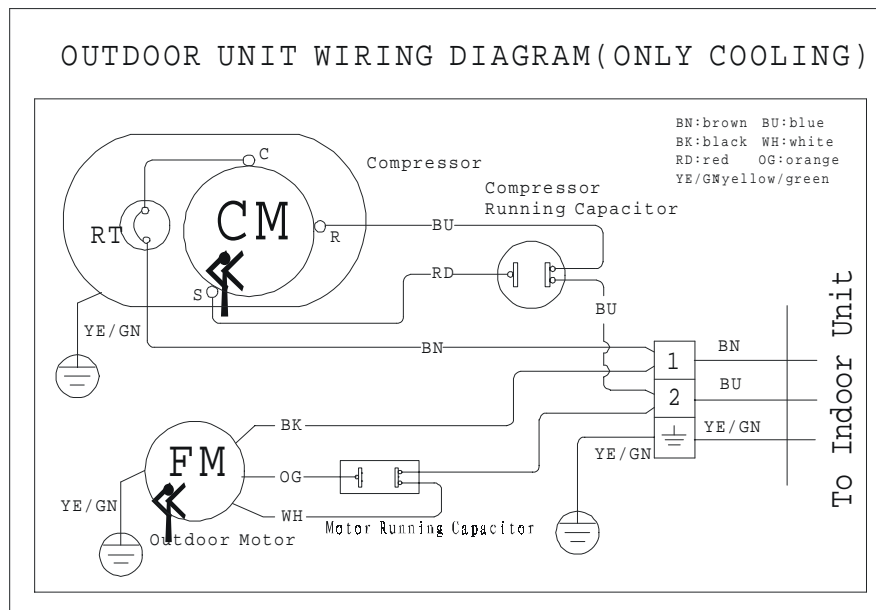
A SERIAL :

1. TA-09CS/TA-12CS

Indoor Unit:

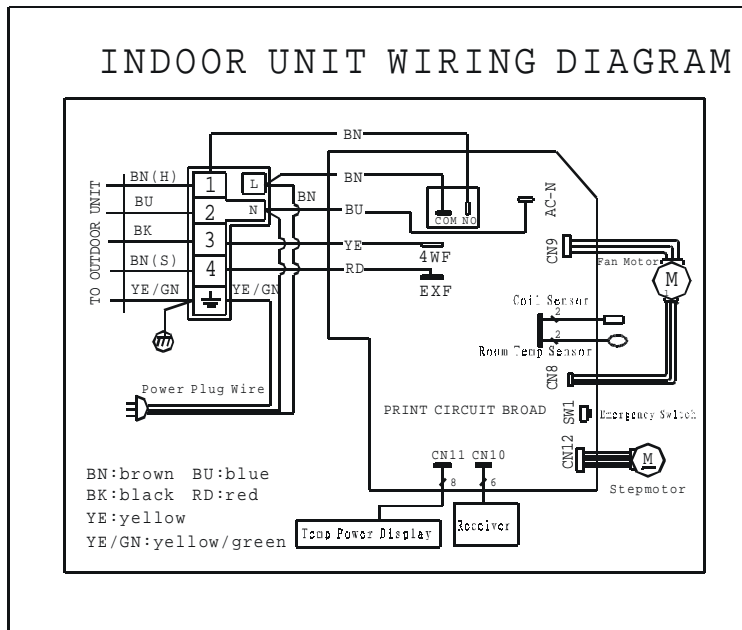


Outdoor Unit:

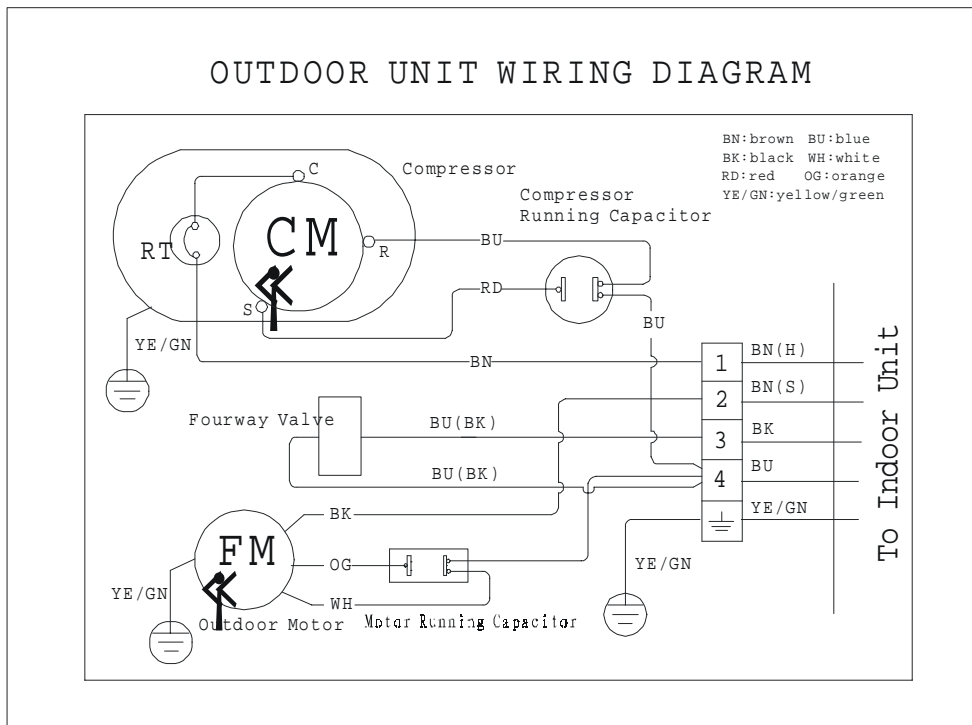


2. TA-09CHS/TA-12CHS

Indoor Unit:

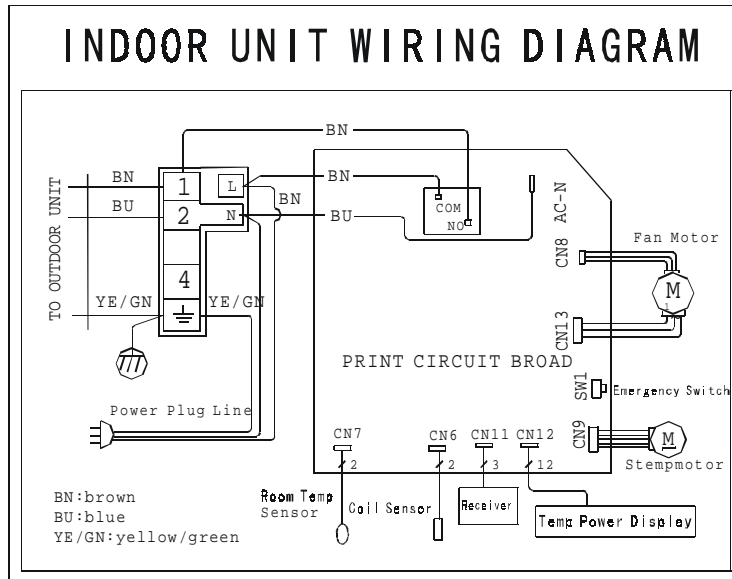


Outdoor Unit:

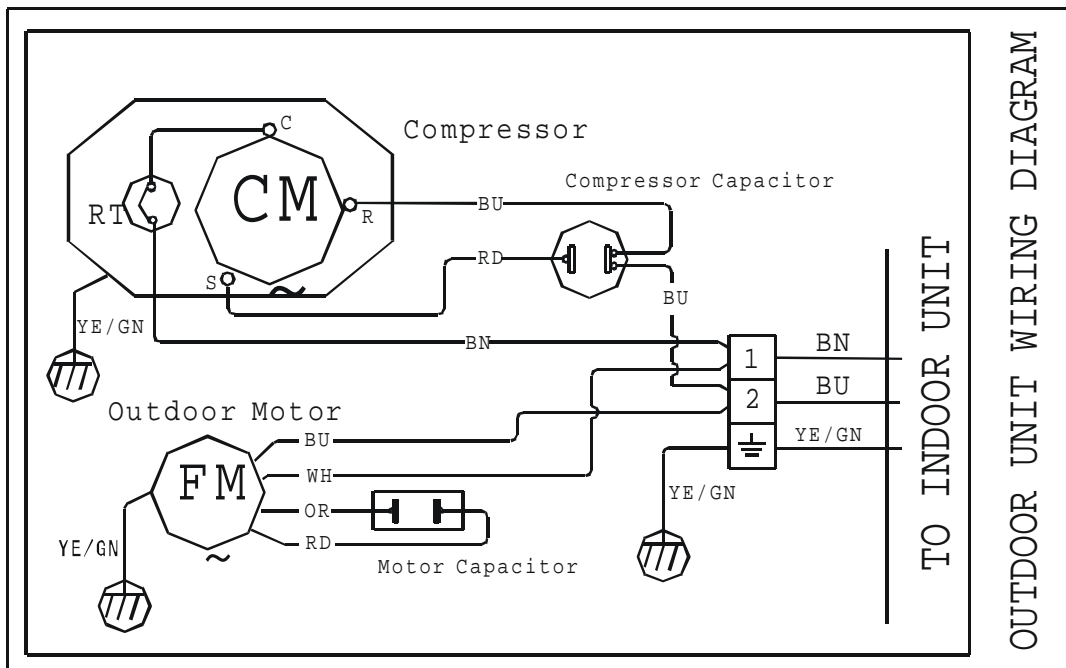


3. TA-16CS/TA-18CS

Indoor Unit:

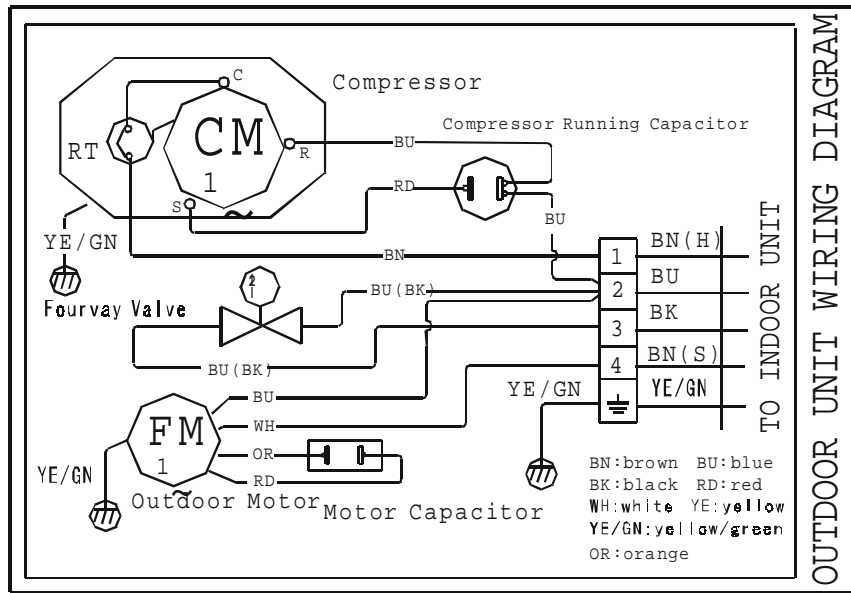


Outdoor Unit:

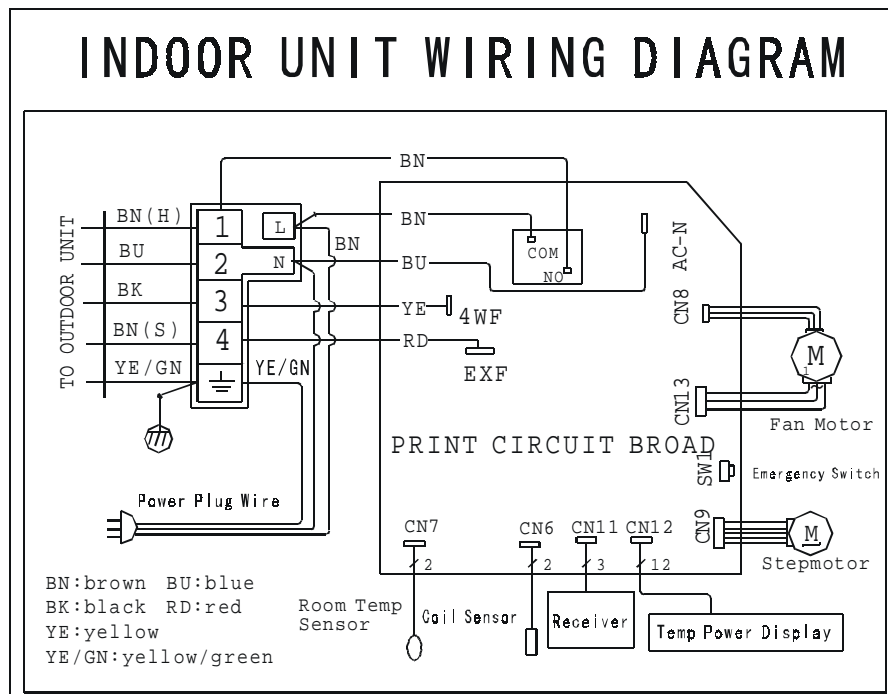


4. TA-16CHS/TA-18CHS

Indoor Unit:



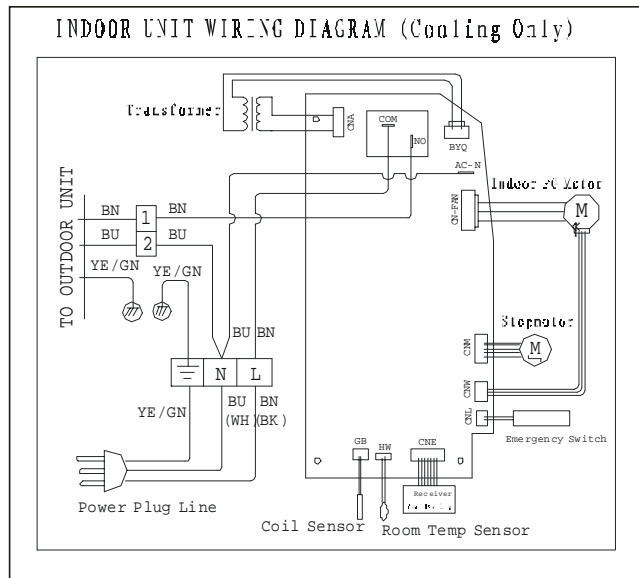
Outdoor Unit:



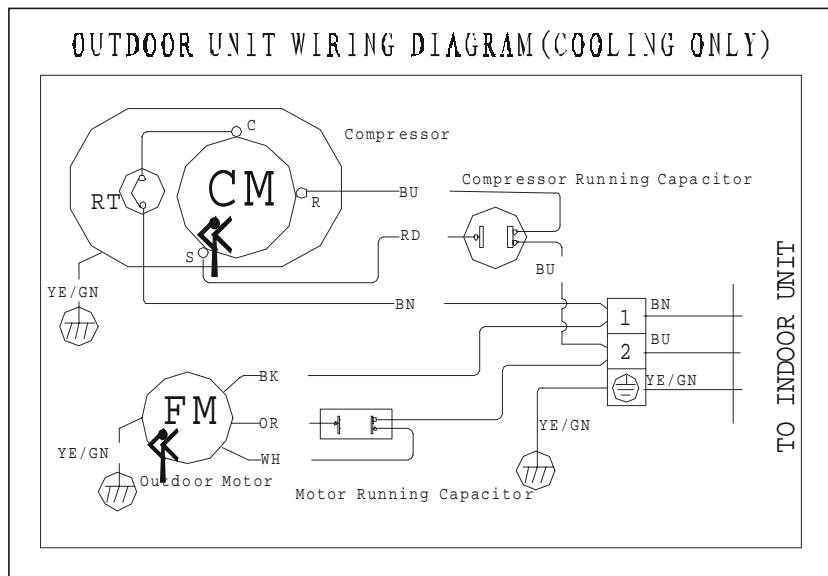
B SERIAL :

1. TA-07CS/TA-09CS/TA-12CS

Indoor Unit:

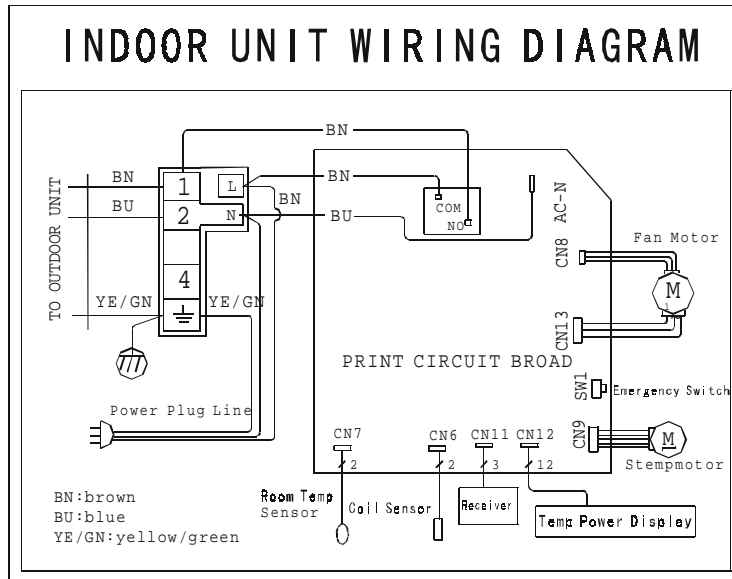


Outdoor Unit:

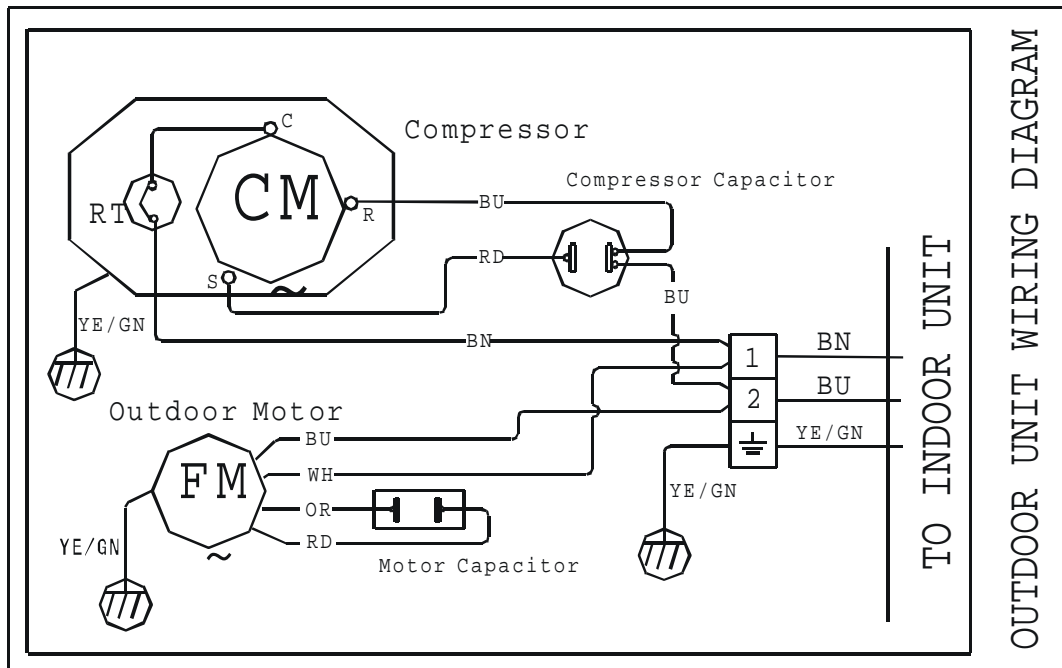


2. TA-07CHS/TA-09CHS/TA-12CHS

Indoor Unit:

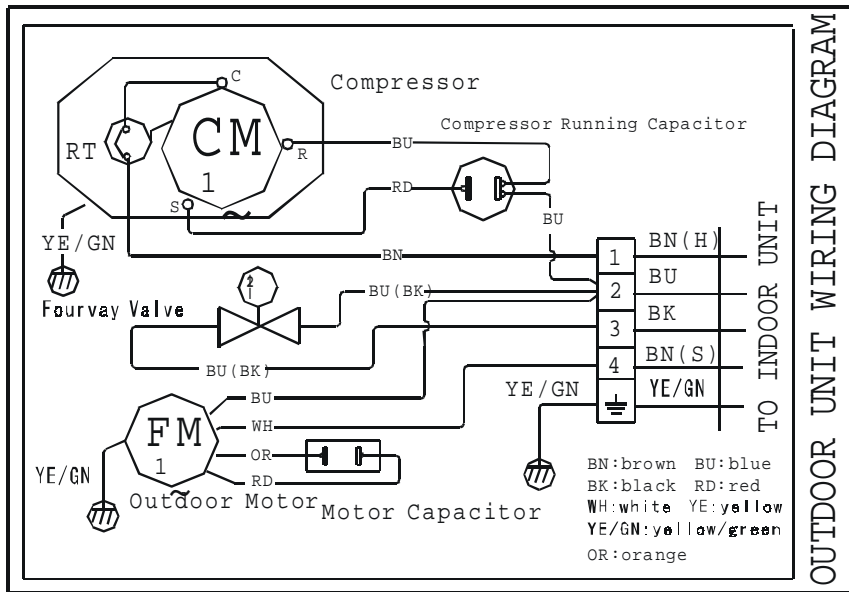


Outdoor Unit:

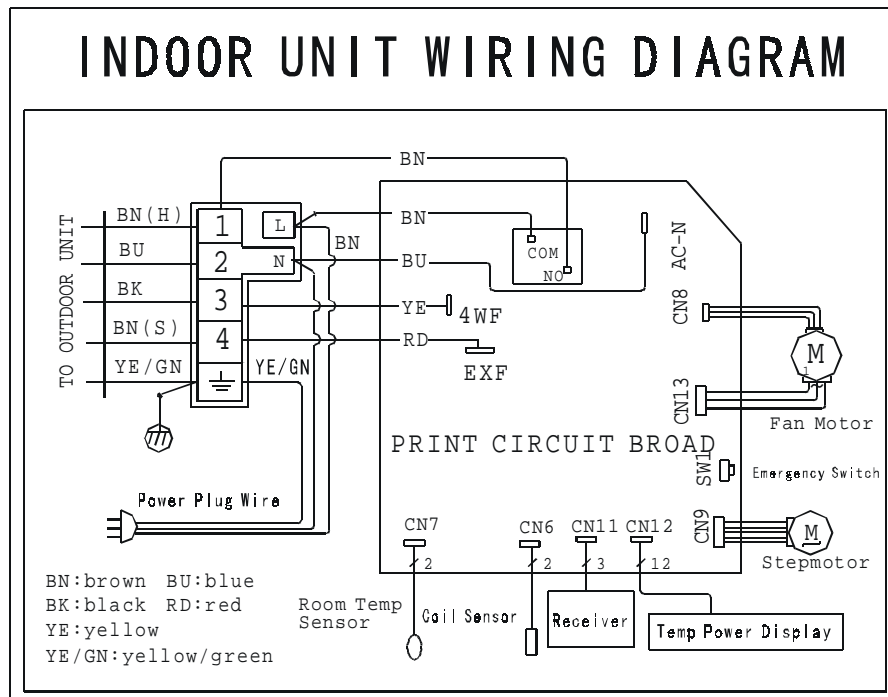


4. TA-16CHS/TA-18CHS

Indoor Unit:



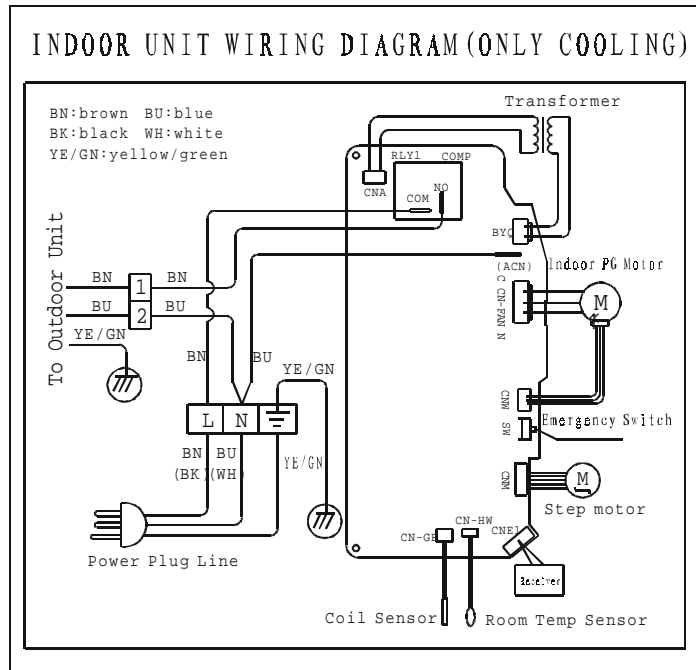
Outdoor Unit:



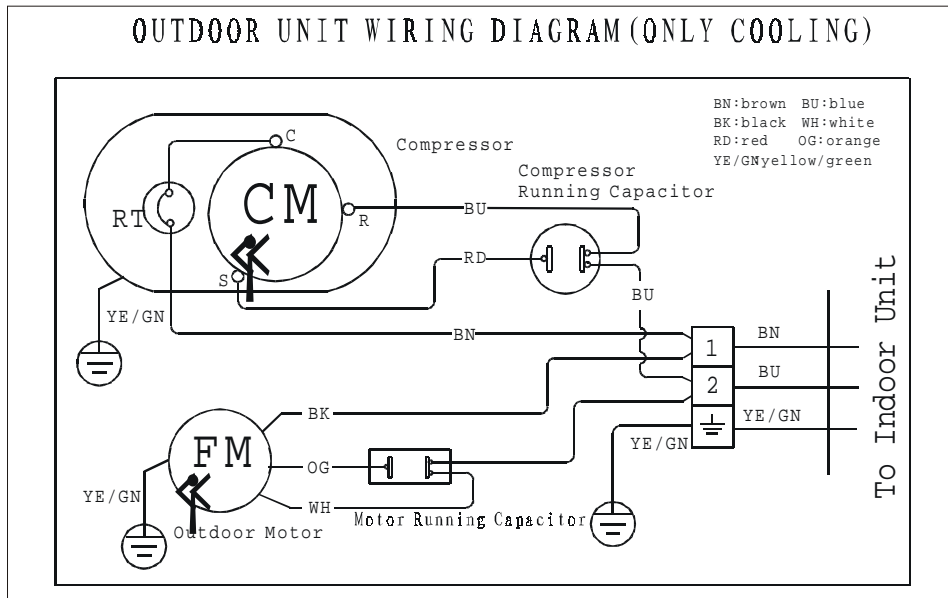
B1 SERIAL :

1. TA-09CS

Indoor Unit:

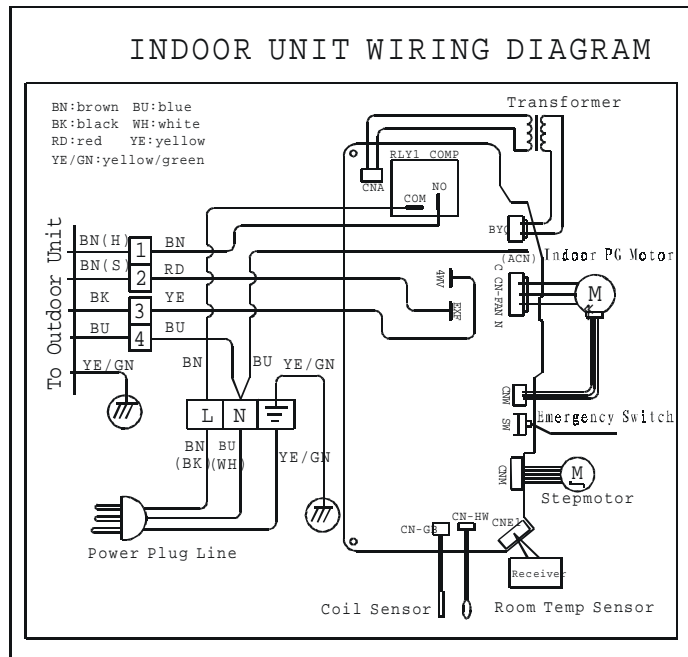


Outdoor Unit:

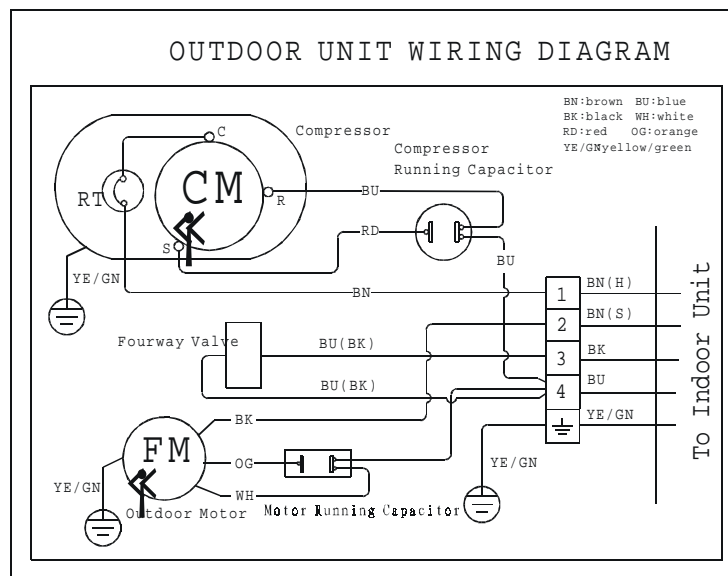


2. TA-09CHS

Indoor Unit:

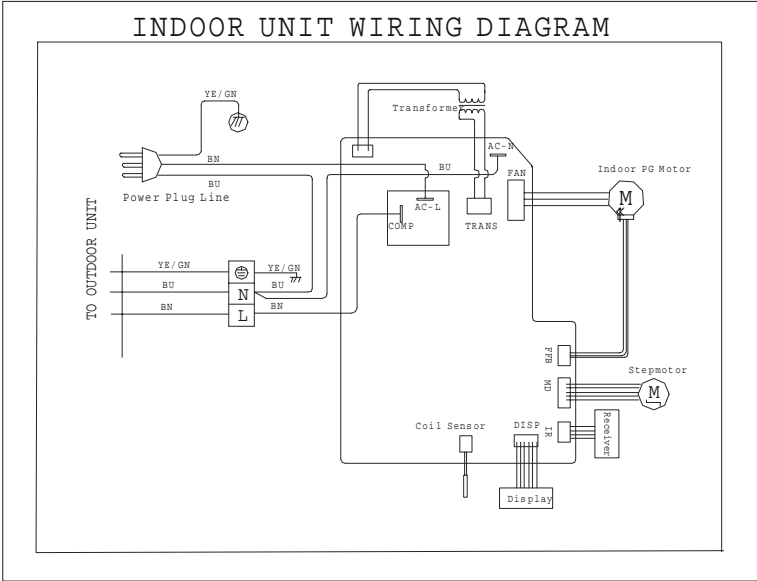


Outdoor Unit:

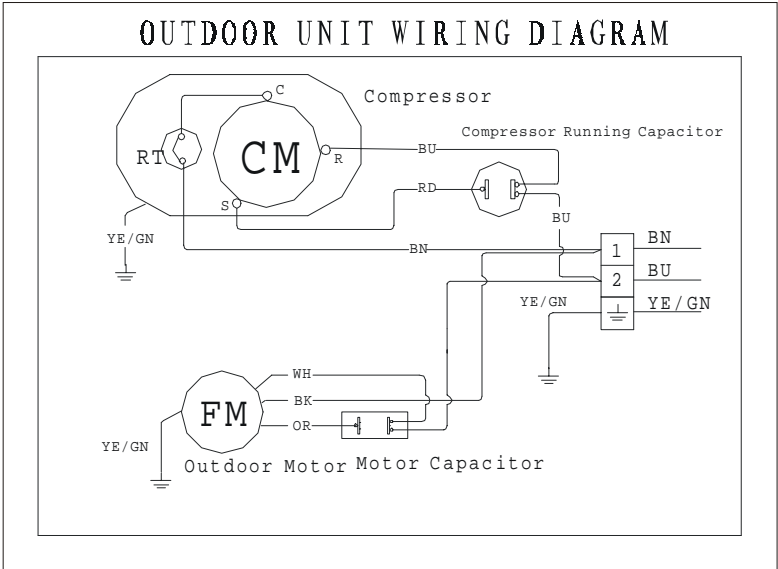


3. TA-12CS/ TA-18CS

Indoor Unit:

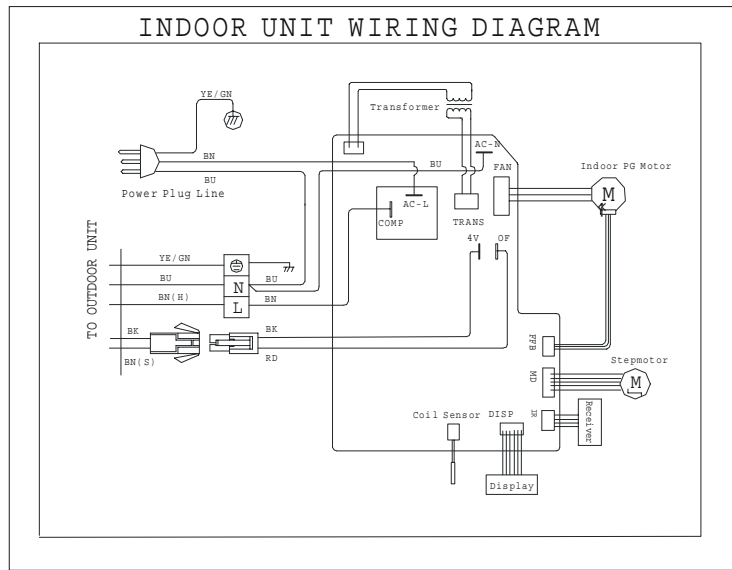


Outdoor Unit:

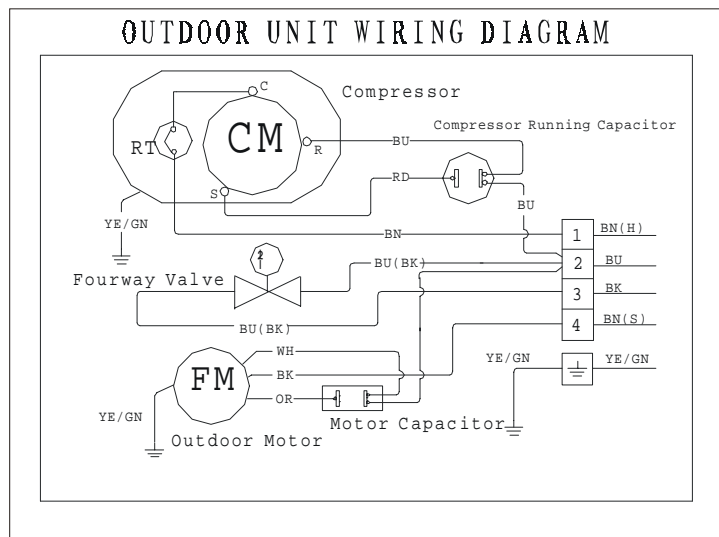


4. TA-12CHS/ TA-18CHS

Indoor Unit:

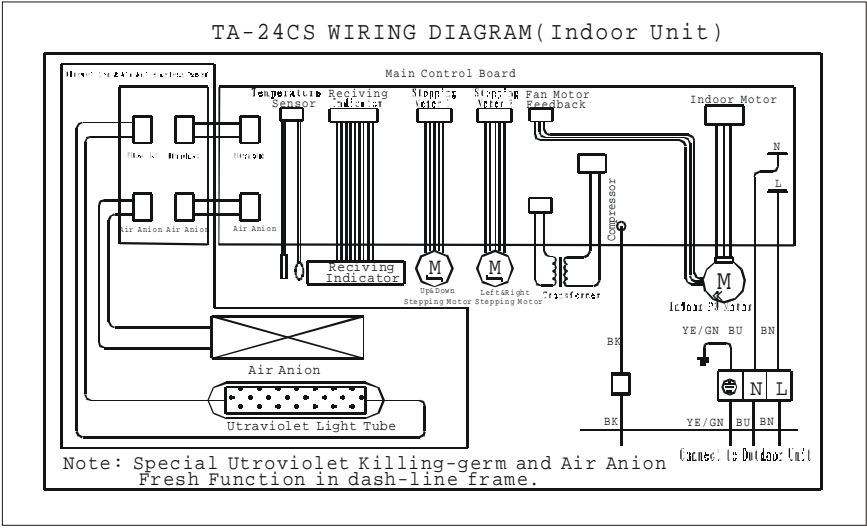


Outdoor Unit:

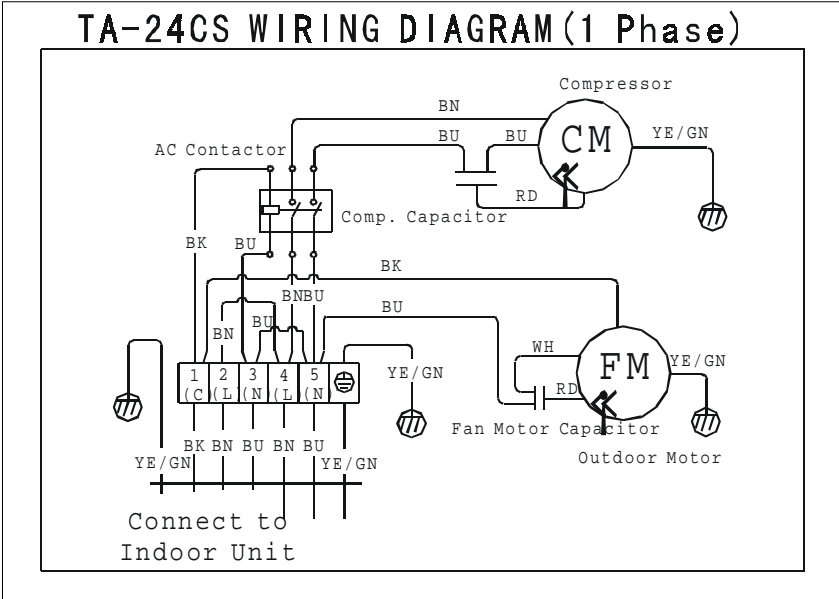


5. TA-24CS

Indoor Unit:

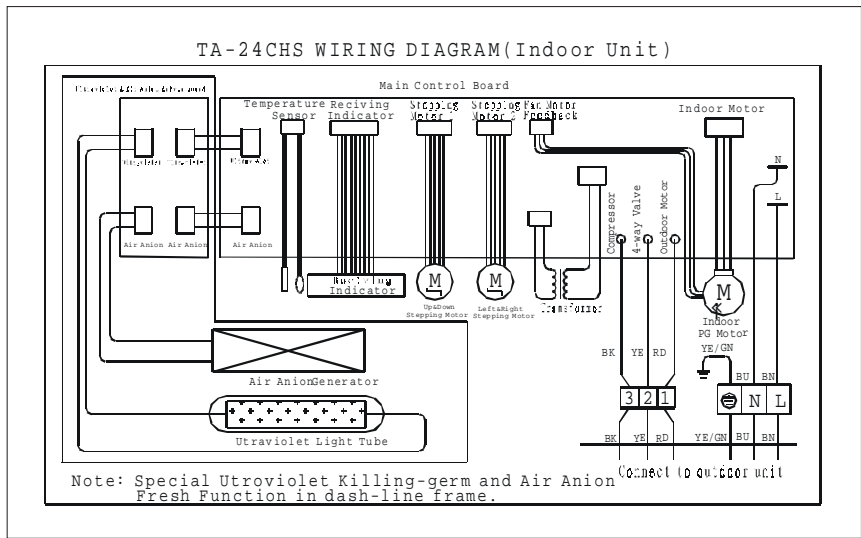


Outdoor Unit:

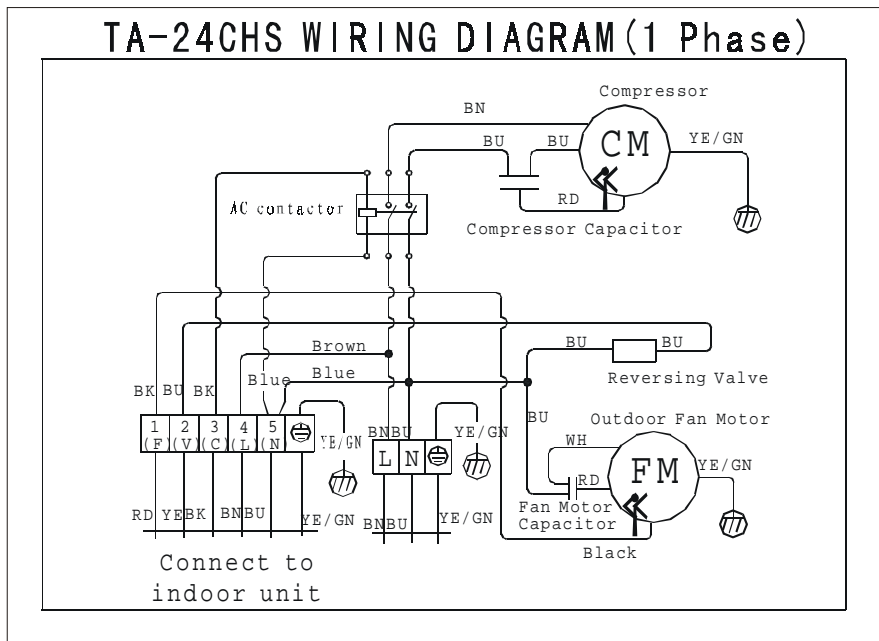


6. TA-24CHS

Indoor Unit:



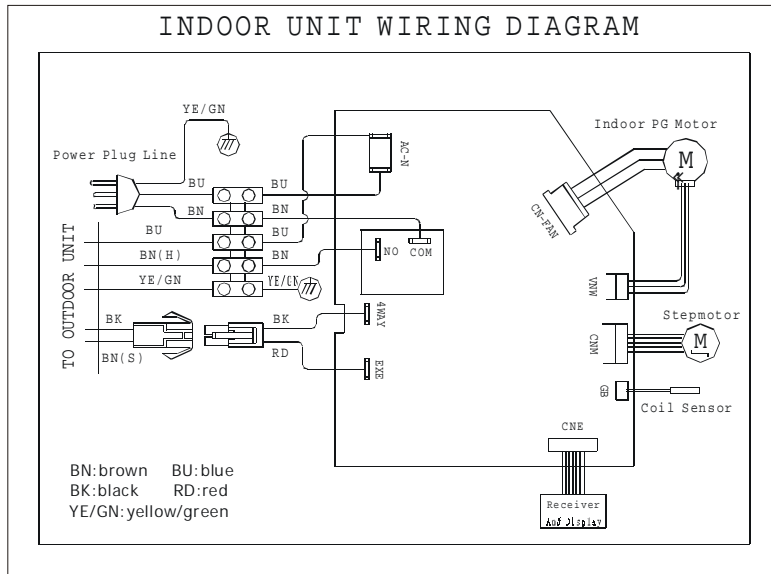
Outdoor Unit:



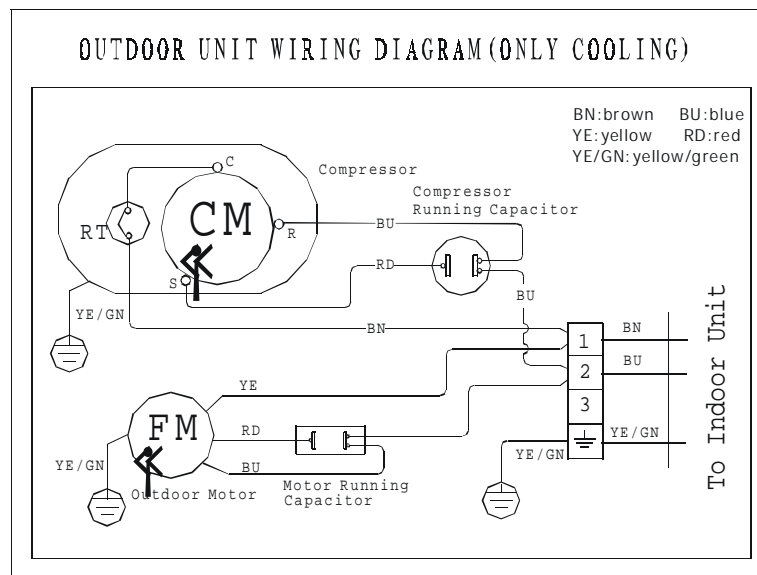
F1 F2 F3 SERIAL :

1. TA-07CS/ TA-09CS

Indoor Unit:

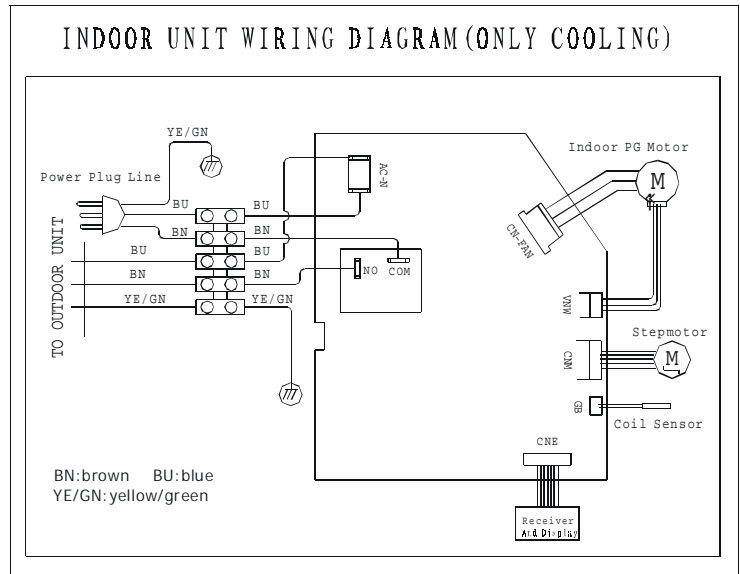


Outdoor Unit:

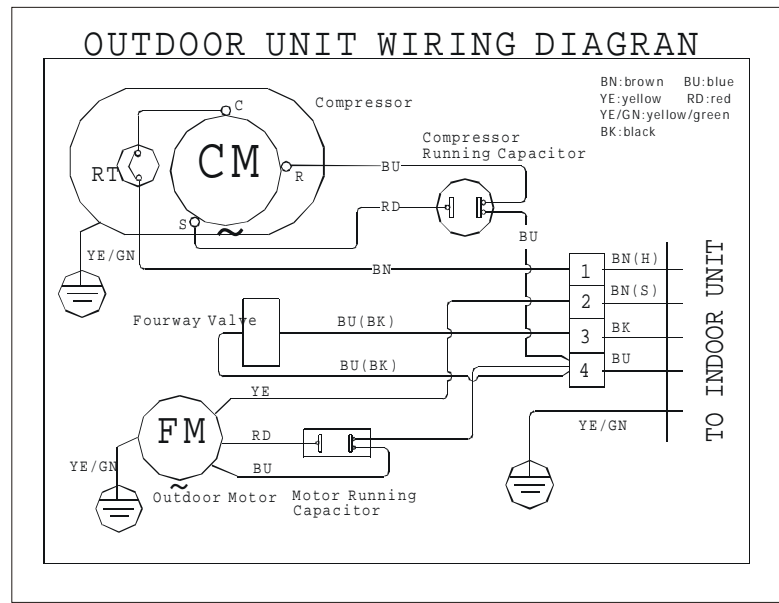


2. TA-07CHS/ TA-09CHS

Indoor Unit:



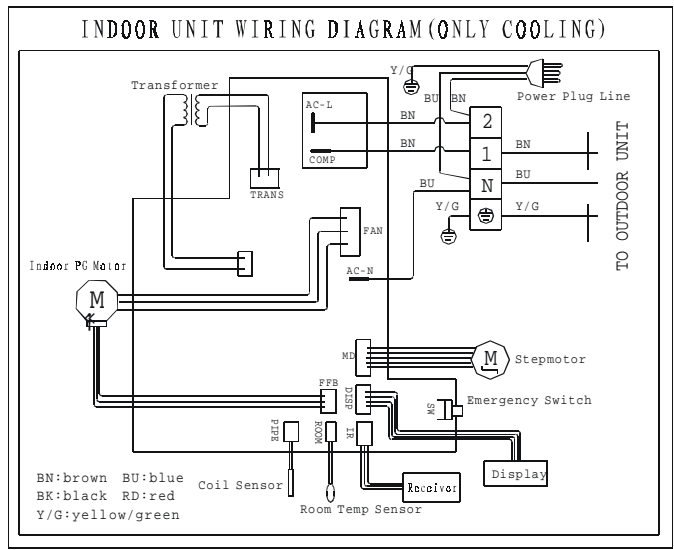
Outdoor Unit:



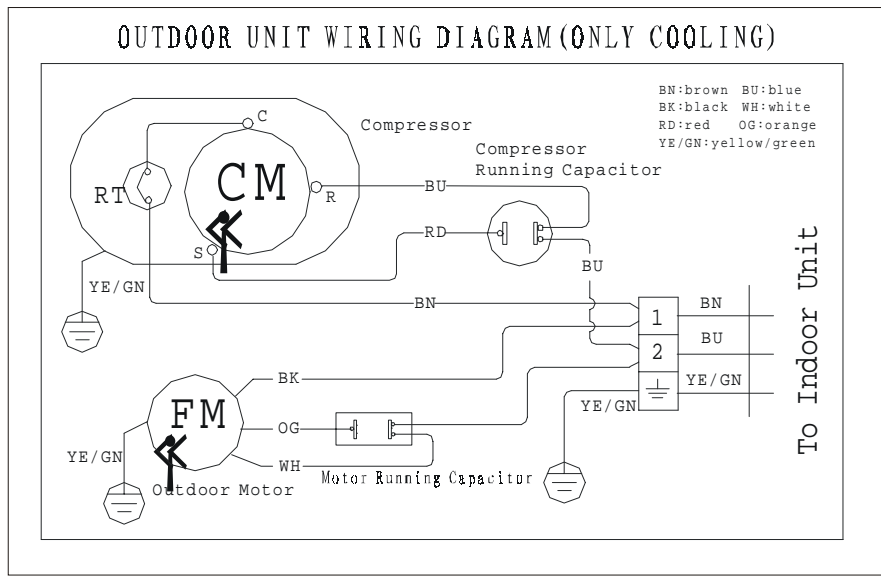
H SERIAL :

1. TA-07CS/ TA-09CS/ TA-12CS/ TA-18CS

Indoor Unit:

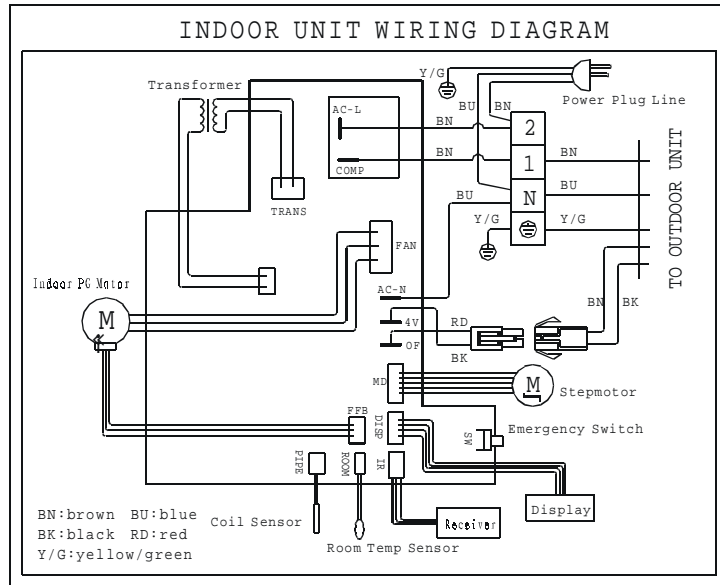


Outdoor Unit:

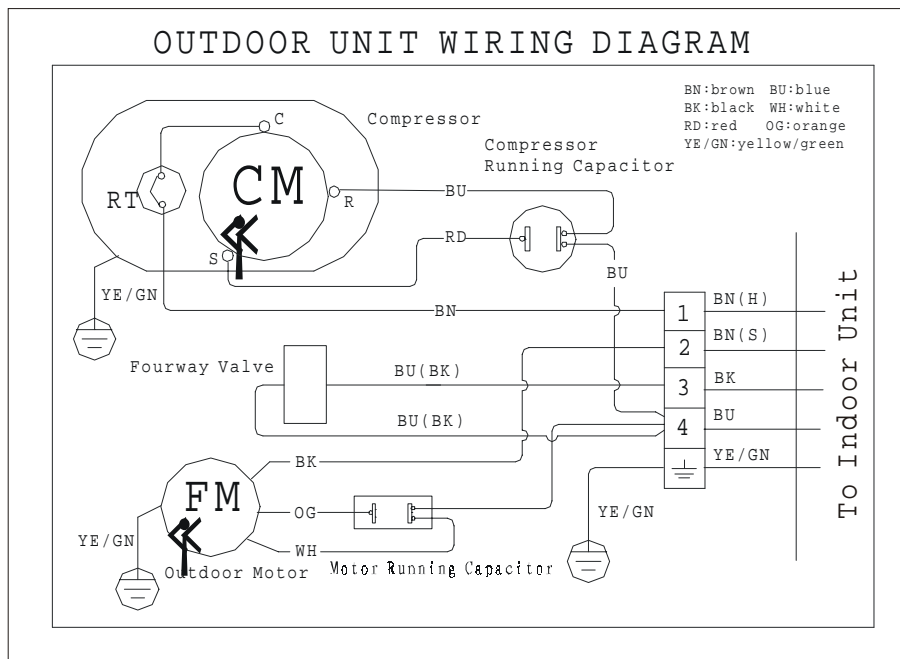


2. TA-07CHS/ TA-09CHS/ TA-12CHS/ TA-18CHS

Indoor Unit:



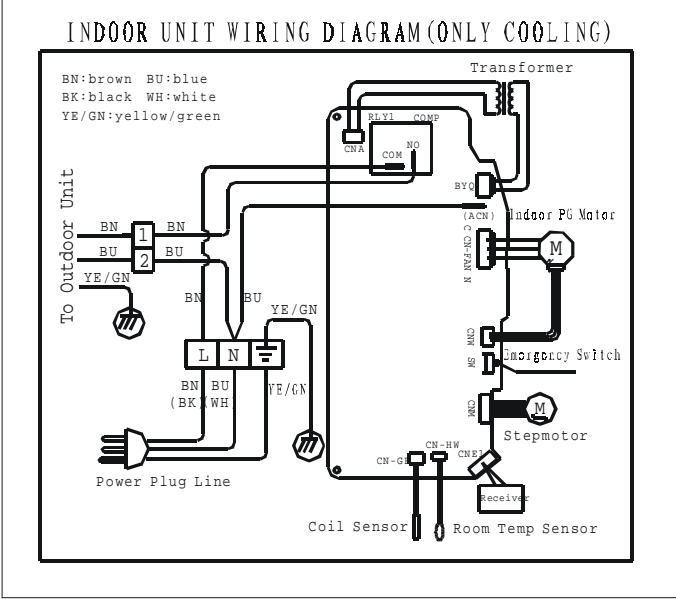
Outdoor Unit:



K1 K2 SERIAL :

1. TA-07CS/ TA-09CS/ TA-12CS

Indoor Unit:

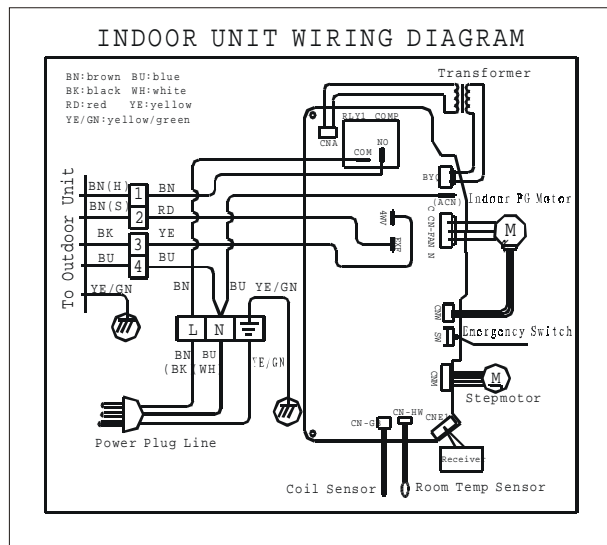


Outdoor Unit:

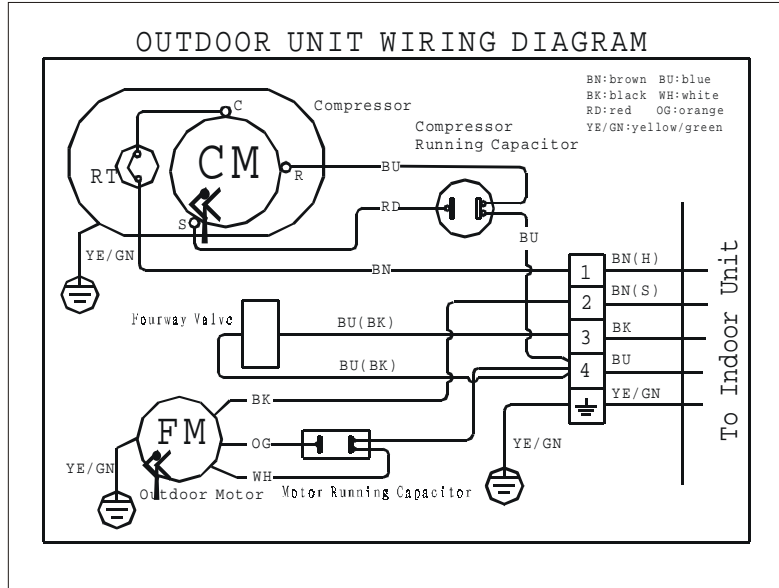


2. TA-07CHS/ TA-09CHS/ TA-12CHS

Indoor Unit:



Outdoor Unit:



Part 4. Trouble shooting

- ANTI-FROST FUNCTION UNDER COOLING, DEHUMIDIFYING MODE

- 1、 When temperature of the indoor unit coil is below or equal to 2℃.And this temperature continues for 5 minutes running. Then indoor fan motor will automatically turn to high speed operation
- 2、 When temperature of the indoor unit coil is below or equals to 0℃.And the compressor has been working for three minutes running. Then the compressor will be switched off. Meanwhile the indoor & outdoor fan motor will turn to low speed operation
- 3、 When temperature of the indoor unit coil is above or equals to 7℃.And the compressor has stopped working for at least three minutes. In this case the compressor is allowed to start again. And the indoor & outdoor fan motor will work under the set mode
- 4、 Temperature of the indoor unit coil must be above or equals to 7℃,When we start the compressor for the first time in a day

二. LED INDICATION & SELF-DIAGNOSIS FUNCTION

- 1 When the unit is switched on, the green LBD is on. When the unit is off, the green LBD is off
- 2 When in need of removing cold air flow and de-frosting under heating operation mode. The green LED will flash on and off (on for 1.5seconds.off for half second)
- 3 Under any operation mode. When there is something wrong with the indoor temperature sensor & coil temperature sensor, the failure can be indicate by yellow & green light as showed in below form.

FAILURE	TIMING LAMP (YELLOW)	OPERATION LAMP (GREEN)
Failure in coil temperature sensor	On	Flash, one time per 8 seconds
Failure in room temperature sensor	On	Flash, one time per 8 seconds
Failure in outdoor unit	Flash, five times per 8 seconds	On
Flash, on 0.5 second, off 0.5 second		

REMARK

(1)、 FAILURE IN OUTDOOR UNIT,WHEN COOLING:

5 minutes after the close of the compressor relay, If the indoor coil temperature keeps higher than 25℃ for 20 minutes running, Meanwhile the timing lamp flashes on and off as showed above, it indicates that the outdoor unit is abnormal. If indoor coil temperature keeps higher 25℃ for 40 minutes running, the compressor, outdoor fan motor will stop running. Yet the indoor fan motor will still keep operation as normal, indication lamp keeps original status, and the green lamp will be on, yellow lamp will flash. During the above-mentioned process, if the compressor relay has ever been off, then the time has to be counted from the moment the compressor relay closes again.

(2)、 If the coil temperature keeps lower than 30℃, when the compressor has worked for 20 minutes running, And indoor fan motor keeps low speed, this indicates that the outdoor unit is abnormal . In this case, the outdoor unit will stop running, Green lamp is on, while yellow lamp flashes.

4 If there is failure in indoor temperature sensor& coil temperature sensor, then the indoor unit will stop working, and the indication lamps indicate the failure as showed in the above form.

三. FAILURE INDICATION MODE FOR TA-16C(H)S/A

(一) FAILURE SYMPTOMS & INDICATION MODE

FAILURE SYMPTOMS	INDICATION MODE		
No refrigerant failure	LAMP30, FLASH	LAMP29, FLASH	LAMP21 ON

Short circuit of room temperature sensor	LAMP30, FLASH	LAMP29, FLASH	LAMP22 ON
Open circuit of room temperature sensor	LAMP30, FLASH	LAMP29, FLASH	LAMP21 22 ON
Short circuit of indoor coil temperature sensor	LAMP30, FLASH	LAMP29, FLASH	LAMP23 ON
Open circuit of indoor coil temperature sensor	LAMP30, FLASH	LAMP29, FLASH	LAMP21 23 ON
Short circuit of outdoor coil temperature sensor	LAMP30, FLASH	LAMP29, FLASH	LAMP22 23 ON
Open circuit of indoor coil temperature sensor	LAMP30, FLASH	LAMP29, FLASH	LAMP21 22 23 ON
Indoor fan motor failure	LAMP30, FLASH	LAMP29, FLASH	LAMP24 ON

(二) NO REFRIGERANT FAILURE

1、 SYMPTOMS OF THE FAILURE

After about 5 minutes the compressor relay closes, if the indoor coil temperature keeps above 25°C (when cooling), or keeps below 30°C (when heating) for 20 minutes running, it indicates that the outdoor unit is abnormal. If the indoor coil temperature keeps above 25°C (when cooling) or keeps below 30°C (when heating) for 40 minutes running, then the unit will be switched off automatically. During the above-mentioned process, if the compressor relay has ever been off, then time has to be counted from the moment the relay closes again.

2、 CAUSES OF THE FAILURE

- * Refrigerant is not sufficient due to leakage
- * The throttleable device is blocked up (when cooling)
- * Something wrong with the indoor PCB board

(三) FAILURE IN SENSORS

1、 SYMPTOMS OF THE FAILURE

There are three kinds of heat-sensitive resistances, which are used separately to adjust the indoor temperature. Control the indoor fan motor. (When heating), to prevent overload (when heating) and prevent frosting (when heating). When something wrong with these resistances, the abnormality will not be displayed and the unit will not stop running, when it is being in operation. Yet when the unit is switched off by remote controller, then the above-mentioned abnormality will be displayed by the indication lamps. And it will reappear during the next switch-off.

2、 CAUSES OF THE FAILURE

- * There may be abnormal with the heat-sensitive resistances
- * There may be disconnection or bad contact between the heat-sensitive resistances and their connecting wire.

SPLIT FLOOR STANDING TYPE

MODEL:

TA-15C(H)F/A; TA-24C(H)F/A; TA-18C(H)F/B;

TA-24C(H)F/B

Features

1. Compact design and elegant appearance.
2. Quiet operation, powerful cooling and heating.
3. Three layers of filtering system, composed of static fiber filter, active carbon and light catalyst filter, is adopted to purify and deodorize room air, ensuring a cleaner and healthier living environment.
4. Intelligentized auto mode and sleep mode operation function, and 24 hours timer function.
5. Mild dehumidifying, auto defrosting and intelligentized temperature sensing.
6. Over heat and over cold protection, three minute restart delay protection.
7. Cold airflow prevention function under heating, anti frozen function under cooling. And auxiliary electric heating system
8. Freon free refrigerant R407c is applied to protect environment.

Part 1. Specification

Part 2. Micro electric control system

一. 40LW control function

1. Function control

- 1) Cooling heating dehumidifying auto modes to choose.
- 2) On-timer function
- 3) Auto defrosting function
- 4) Set temperature range: 18 - 30°C
- 5) Compressor restart 3 minutes delay protection
- 6) Auto flow, high flow, middle flow, low flow to choose.
- 7) Self diagnosis function.

2. Controller description

There are 3 parts controller, including remote control, indoor operation panel, indoor control main board.

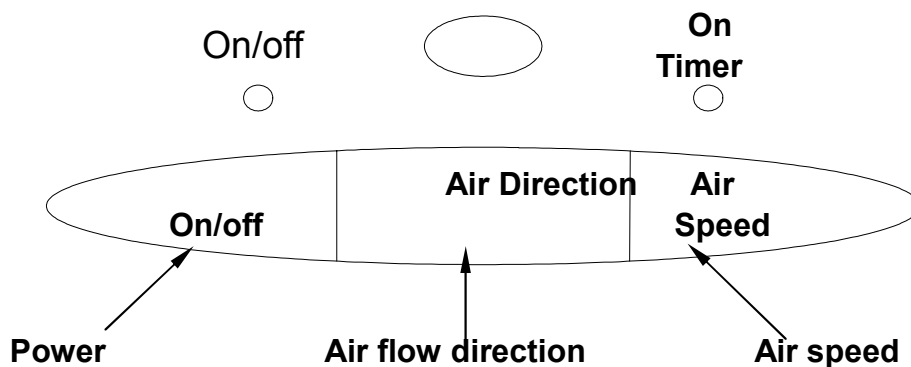
3. Controlled object:

- 1) Indoor fan motor (Fan motor, Hi、Mid、 Lo);
- 2) Air flow direction (同步 motor)
- 3) Compressor
- 4) Outdoor fan motor
- 5) Reversing valve

4. Data

- 1) Room temperature = Ta
- 2) Evaporate temperature = Te
- 3) Condenser temperature = Tc

5. Description of the operation panel:



Indicator light: Power indicator (Green and Red)、On-Timer indicator (yellow)

Button: On/off、Air direction、Air speed

5.1 Button description:

1) On/off:

- a. Press one time, the unit is on, press again, the unit is off. At the beginning the unit goes into Auto mode,

if receive any signal form the remote control, change into another mode as the signal.

- b. First usage, press emergency button for 3 seconds, the buzzer will buzz three times, and the unit goes into Cooling mode forcibly, the compressor, outdoor fan is on, indoor fan is under high flow mode, swing louver works, after 30 minutes, the unit will be shut down automatically, and then change into waiting mode. Emergency button is also be pressed to stop the unit. If there is signal from the remote control, the unit will works as the signal.

2) Air direction:

press one time , air flow direction is fixed, press again , air flow direction change to swing.

3) Air speed:

Every press, the air speed will change as this circle: HI→MID→LO→AUTO.

5.2 Indicator light description:

5.2.1 Indicator light:

- 5.2.2.1 Power on, waiting mode, the red light is on.
- 5.2.2.2 Operate period, green light is on.
- 5.2.2.3 Anti cold wind and defrosting period, green light flash.

5.2.2 On-Timer (yellow):

- 5.2.2.4 Timer-power on , Timer-power off and sleep function is set, the yellow light is on.
- 5.2.2.5 Any trouble, the yellow light flash.

6. Operation mode:

a) Cooling mode:

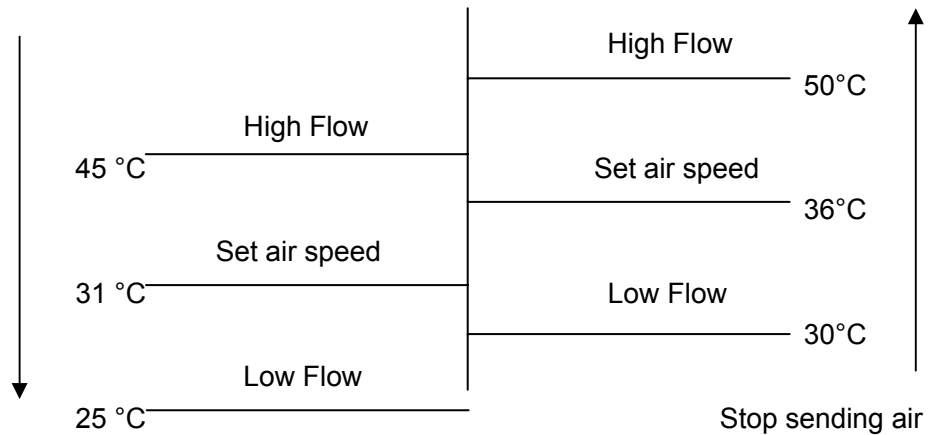
1. Set temperature: 18~30°C;
2. When $T_a \geq T_s + 1^\circ\text{C}$, the air conditioner goes into pre-cooling mode, the compressor and outdoor fan run, the indoor fan run as the set air speed.
3. When $T_a \leq T_s - 1^\circ\text{C}$, the air conditioner stops, the compressor and outdoor fan stop, too, indoor fan still run as the set air speed.

b) Dehumidifying (Pre –set 25°C):

1. When $T_a \geq T_s + 1^\circ\text{C}$, the air conditioner goes into standard cooling mode,
2. When $T_a \leq T_s - 1^\circ\text{C}$, the air conditioner goes into dehumidifying mode, the compressor, outdoor fan work for 10 minutes, stop for 6 minutes, repeat this circulation, the compressor is on and the indoor fan run in low flow mode.
3. When in dehumidifying, if $T_a \geq T_s + 1^\circ\text{C}$, the air conditioner change into standard cooling mode.
4. Dehumidifying protection: $T_a \leq 15^\circ\text{C}$, the air conditioner stops; when $T_a \geq 17^\circ\text{C}$, restarting dehumidifying.

c) Heat mode (Only available in cooling and heat air conditioner):

1. Set temperature: 18~30°C;
2. Under heat mode, reversing valve is on.
3. When $T_a \leq T_s - 1^\circ\text{C}$, if the unit operates for the first time, or 3 minutes later (3 minutes delay function), the unit will run in heat mode, the compressor and the outdoor fan run, indoor fan runs regarding to the set air speed and the anti cold wind function.
4. When $T_a \geq T_s + 1^\circ\text{C}$, the air conditioner stops, the compressor and outdoor fan stop, the reversing valve is still on, indoor fan runs regarding to the anti cold wind function.
5. Indoor air speed control and anti cold wind function:



- (1) In heat mode, indoor fan speed control and anti cold wind function work as above chart.;
- (2) When the compressor works, indoor fan doesn't stop.
- (3) When indoor coil < 31°C, indoor fan works in low air flow mode.
- (4) If the indoor coil is still lower than 30°C after 2 minutes' working, indoor fan works in low air flow mode forcibly.
- (5) If the compressor works, before the indoor fan's working, the indicator light (green) will flash (0.5 second off, 1.5 second on).

d) Defrosting:

In heat mode, if $T_e - T_a < 17^\circ\text{C}$ and this condition last 1 minute (the compressor totally working for 44 minutes), begin to defrost, the reversing valve, indoor fan stop, the compressor continue working.

Defrosting ending: if the defrosting last more than 6 minutes, defrosting ends, the reversing and outdoor fan start to work, indoor fan work regarding to anti cold wind function.

In defrosting period, indicator light (green) flash (0.5 second off, 1.5 seconds on).

e) Auto mode:

1. In auto mode, indoor fan works in low flow mode for 20 seconds, and then decide the working mode regarding to the room temperature.
2. The relationship of the working mode and the room temperature:

Ta	$T_a \geq 26^\circ\text{C}$	$26^\circ\text{C} > T_a \geq 21^\circ\text{C}$	$T_a < 21^\circ\text{C}$
Mode	COOLING	DEHUMIDIFYING	HEAT

NOTE: COOLING ONLY: $T_a < 26^\circ\text{C}$ working mode is dehumidifying mode.

3. If the air conditioner change to auto mode from cooling, heat, or dehumidifying mode, or the air conditioner restart in auto mode one hour later, the unit will work as its pre mode. (under this situation, indoor fan don't work in low air flow mode).

f) Economic mode:

In economic mode, set temperature will rise 2°C in cooling, dehumidifying, while reduce 2°C in heat mode, and the unit is in low flow forcibly, the fan speed can not change in economic mode.

g) Strong mode:

In strong mode, when the unit is in cooling, heat, or auto mode, indoor fan speed will work in high flow mode, will change to set air flow speed after 15 minutes, during this 15 minutes, the air flow speed can not be changed.

h) Timer on:

The air conditioner can be set the start-up time at 1-24 hours later.

The start-up function should be set in operation mode.

After setting, the air conditioner shut down immediately, the operation light (green) is off, the timer light is on.

i) Sleep mode:

This function can be set shut-down after 1、2、3、4、5、6、10 hours, the air conditioner will shut down automatically as the indication.

j) Indoor fan auto air speed control:

When the air flow is set as auto mode, the indoor fan speed is control as following chart:

Mode	Heat			Cooling			Fan		
High Mid Lo Stop									
Ta	-4	-2	▲	▲	+2	+4	▲	+2	+4

7. Other control:

1) Swing louver control

Only if the indoor fan runs, the swing louver control works.

2) The buzzer control

The controller start or receive the proper signal from the remote controller, the buzzer will short buzz once.

Special:

- a. Forcible: three short buzz
- b. Power on: two short buzz
- c. Power off: a long buzz.

9. Protection:

a) Compressor delay protection

There will be a 3 minutes interval before the restarting of the unit.

b) Indoor anti frosting protection

In cooling and dehumidifying mode, after the compressor works for 10 minutes, if indicates that $T_e \leq 7^\circ\text{C}$, and this situation last for 20 seconds, the compressor and outdoor fan will stop, only if $T_e = 7^\circ\text{C}$, the unit restarts automatically, and goes into the pre mode.

c) Indoor anti super heat protection

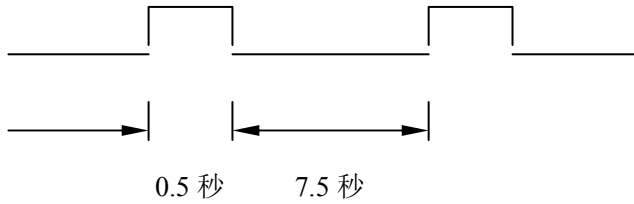
In heat mode, when it indicates $T_e \geq 58^\circ\text{C}$, outdoor fan stops, when $T_e \leq 47^\circ\text{C}$, the outdoor fan restart to work.

When it indicates $T_e \geq 65^\circ\text{C}$, and this situation last for 10 minutes, the compressor stops.

10. Trouble in temperature sensor (if the indicated temperature $AD \leq 5^{\circ}\text{C}$ or $> 100^{\circ}\text{C}$);

a) Trouble

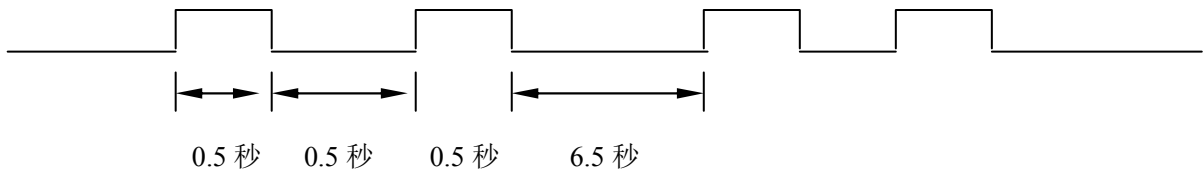
In operation period, this trouble, timer light (yellow) will flash as below



- a. In cooling mode, works in forcible cooling mode, the anti frosting function also works, if indoor temperature trouble, the compressor and the outdoor fan stop, indoor fan work as set fan speed.
- b. In fan mode, operate properly.
- c. In dehumidifying, the compressor indoor fan, outdoor fan work 6 minutes in circulation, the indoor anti frosting function also works, if there is trouble in the indoor temperature sensor, the compressor and outdoor fan stop, indoor fan works in low flow mode.
- d. In heat mode, works in forcible heat mode, defrosting and indoor super heat protection work, if there is trouble in the indoor temperature sensor, the compressor and outdoor fan and indoor fan stop.
- e. In auto fan mode, works in mid flow mode.
- f. In auto mode, works in forcible cooling mode, air flow speed can change.
- g. If the trouble is overcome, will restart automatically.

b) Indoor temperature sensor trouble shooting :

In operation, if indoor temperature sensor troubles, the indoor timer light (yellow) flash as below



- a. Any mode can work properly, but the indoor coil temperature protection don't work.
- b. Anti cold wind will controlled by the time, in heat mode, indoor fan run after 45 seconds' delay, if the unit is power off, the indoor fan stop after 30 seconds' delay.
- c. If the trouble is overcome, will restart automatically.

11. Technology data:

a)

1. Main controller board : 160VAC~250VAC ~50±1HZ
2. Remote control : DC3V 适用电压范围 2.4~3.3V

- b) Working room temperature-20°C~+70°C;
- c) Working room humidity: 10%~90%;
- d) Time precision: 1h±1min
- e) Temperature precision: ±1°C。

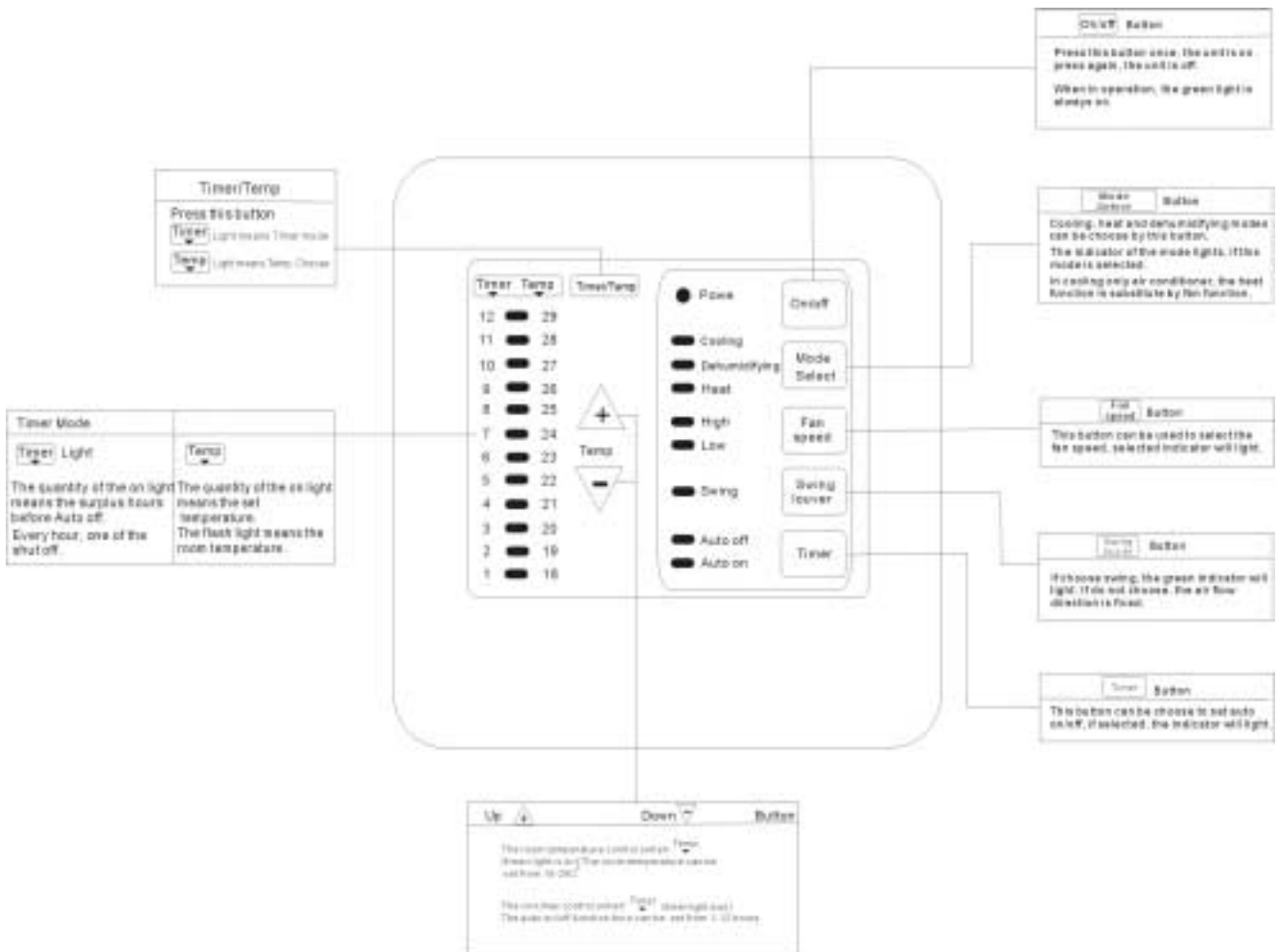
二. 60LW control function

1. Function control

- 1) Cooling heating dehumidifying auto modes to choose.
- 2) On-timer function
- 3) Auto defrosting function
- 4) Set temperature range: 18 - 30°C
- 5) Compressor restart 3 minutes delay protection
- 6) Auto flow, high flow, middle flow, low flow to choose.
- 7) Self diagnosis function.

2. Control panel description

1) Panel introduction



2) Operation

ON/OFF button can be used to control the power.

MODE SELECT control as below:

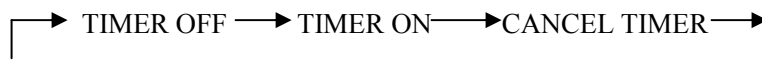


FAN SWEED control as below:



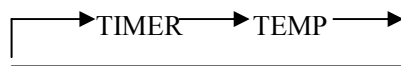
Three fan speed to choose: High、Middle、Low. When in middle air speed, the high speed and low speed indicator light on the same time.

TIMER MODE control as below:



Set time from 1~12 hours, every interval is 1 hour, and the light go off one by one every hour.

TIMER/TEMP control as below:

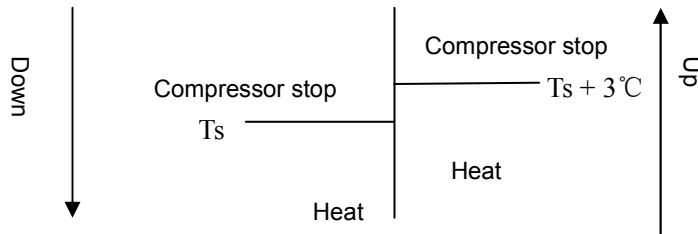


Press TIMER/TEMP button, can switch the mode between Timer and Temp, set temperature is from 18~29°C, interval is 1°C。

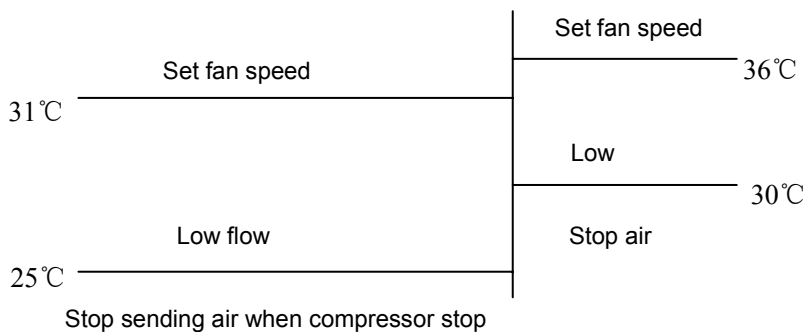
UP and DOWN button can be used to change the temperature or hour.

3. Heat mode

- 1) If T_a is lower than T_s , first start-up or 3 minutes delay later, the compressor runs, if T_a is higher than $T_s + 3^\circ\text{C}$ the compressor will stop, and begin 3 minutes delay function.



Anti cold wind function:



- a When the compressor stops, indoor fan runs as above chart
- b When the compressor runs, indoor fan never stops.
- c When indoor coil temperature is lower than 31°C indoor fan works in low air flow mode.

- 2) Electricity heat control

Only if the compressor and indoor fan run, this function works and all following conditions meet:

- a $T_{\text{coil}} < 36^{\circ}\text{C}$;
- b $T_a < 18^{\circ}\text{C}$;
- c $T_a \leq T_s - 3^{\circ}\text{C}$.

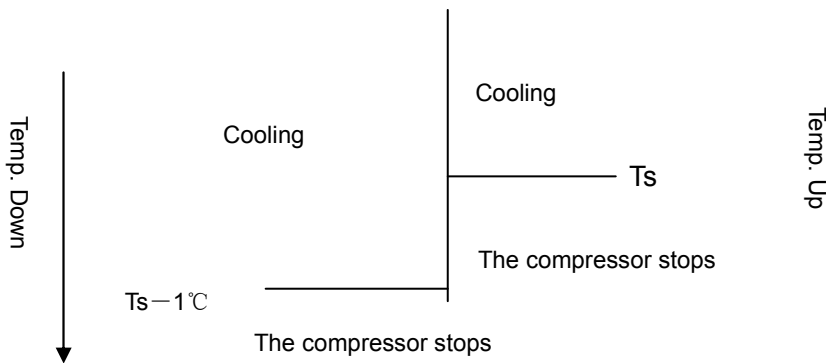
This function will shut down if any of following conditions occur:

- a The compressor shut down;
- b $T_{\text{coil}} > 39^{\circ}\text{C}$;
- c $T_a \geq 20^{\circ}\text{C}$;
- d $T_a > T_s - 1^{\circ}\text{C}$.

When this function shut down, indoor fan will stop working after 15 seconds delay.

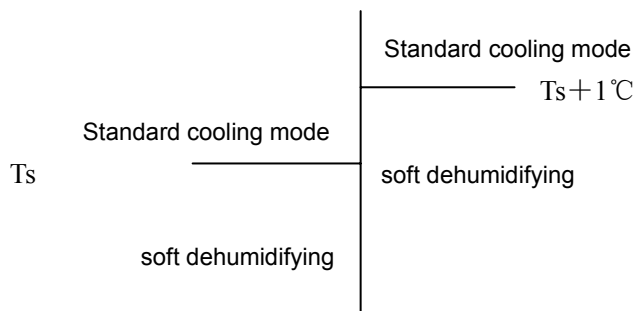
4. Cooling mode

The fan works as set fan speed, the compressor works as set temperature, when T_a is higher than T_s , the compressor runs, when $T_a \leq T_s - 1^{\circ}\text{C}$, the compressor will stop, but indoor fan still works, in cooling mode, fan speed can be choose in high flow, middle flow, and low flow modes. This lead to strong cooling, middle cooling and weak cooling.

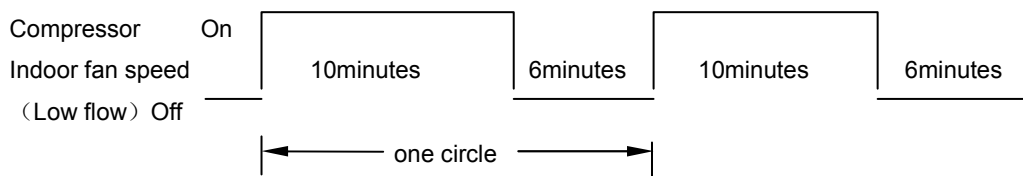


5. Dehumidifying mode

- a. When in dehumidifying mode, the air conditioner will be in cooling mode until $T_a = T_s$, and then change into soft dehumidifying mode.
- b. When into soft dehumidifying mode, the compressor and indoor fan will work for 10 minutes, during the compressor working period, the fan speed always in low flow.
- c. When in soft dehumidifying, if $T_a \geq T_s + 1^{\circ}\text{C}$, the air conditioner will change into cooling mode.



Soft dehumidifying, the compressor and the indoor fan work together.



6. Fan mode

In fan mode, the compressor stops, indoor fan works as set air speed, air flow speed can be set as high, middle and low modes.

7. On-Timer function

The air conditioner will be on automatically, when it is the set time, and left hours will be shown.

8. Off-Timer function

The air conditioner will be off automatically, when it is the set time, and left hours will be shown.

9. Defrosting function (only in cooling & heat air conditioner)

9.1 Defrosting function will begin when below conditions meet:

- a The compressor continue working for more than 10 minutes.
- b Working time Temperature

When 20minutes	outdoor coil temperature < -13°C
or 30 minutes	outdoor coil temperature < -12°C
or 40 minutes	outdoor coil temperature < -11°C
or 60 minutes	outdoor coil temperature < -10°C
or 90 minutes	outdoor coil temperature < -8°C
or 120 minutes	outdoor coil temperature < -6°C

When dehumidifying function begins, four-way valve is off, indoor fan stop, the compressor works and indicator light is on.

9.2 Defrosting will end when outdoor coil temperature is higher than 10.5°C or continued working for 8 minutes. The four-way valve is on, the air conditioner change back to heat mode.

10. Swing louver control

10.1 The swing louver can be set manually at any angle.

10.2 The swing louver can also be set to swing.

11. Protection

- a Slugging protection (indoor defrosting):

When indoor coil temp. is lower than 0°C, the compressor stops, and will go back to run when it is 7°C.

- b Indoor super heat protection (only in cooling & heat air conditioner):

When indoor coil temp. is higher than 60°C, outdoor fan stops, when it is lower than 55°C it will go back to run.

- c Anti cold wind protection (only in cooling & heat air conditioner):

When indoor coil temp. is higher than 30°C, the stop sending air condition meets, the fan stops and heat indicator flash.

- d There is 3 minutes delay when the compressor restarts.
- e Outdoor unit abnormal protection:
When the compressor works for 5 minutes, if $|T_a - T_{coil}| \leq 3^\circ\text{C}$, and last for 5 minutes, the system decide there are trouble in outdoor unit, the compressor and outdoor fan stop.

12. Indoor unit self diagnosis

TIMER ▽	TEMP ▽	Trouble indication	Reason
12-29 11-28		Flash	Indoor thermistor (RT1) trouble
10-27 9-26		Flash	Indoor thermistor (RT2) trouble
8-25 7-24		Flash	Indoor thermistor (RT3) trouble
6-23 5-22		Light, and Timer Temp indicator flash.	Outdoor unit abnormal
2-19 1-18		Light, and Timer Temp indicator flash.	Trouble indicator

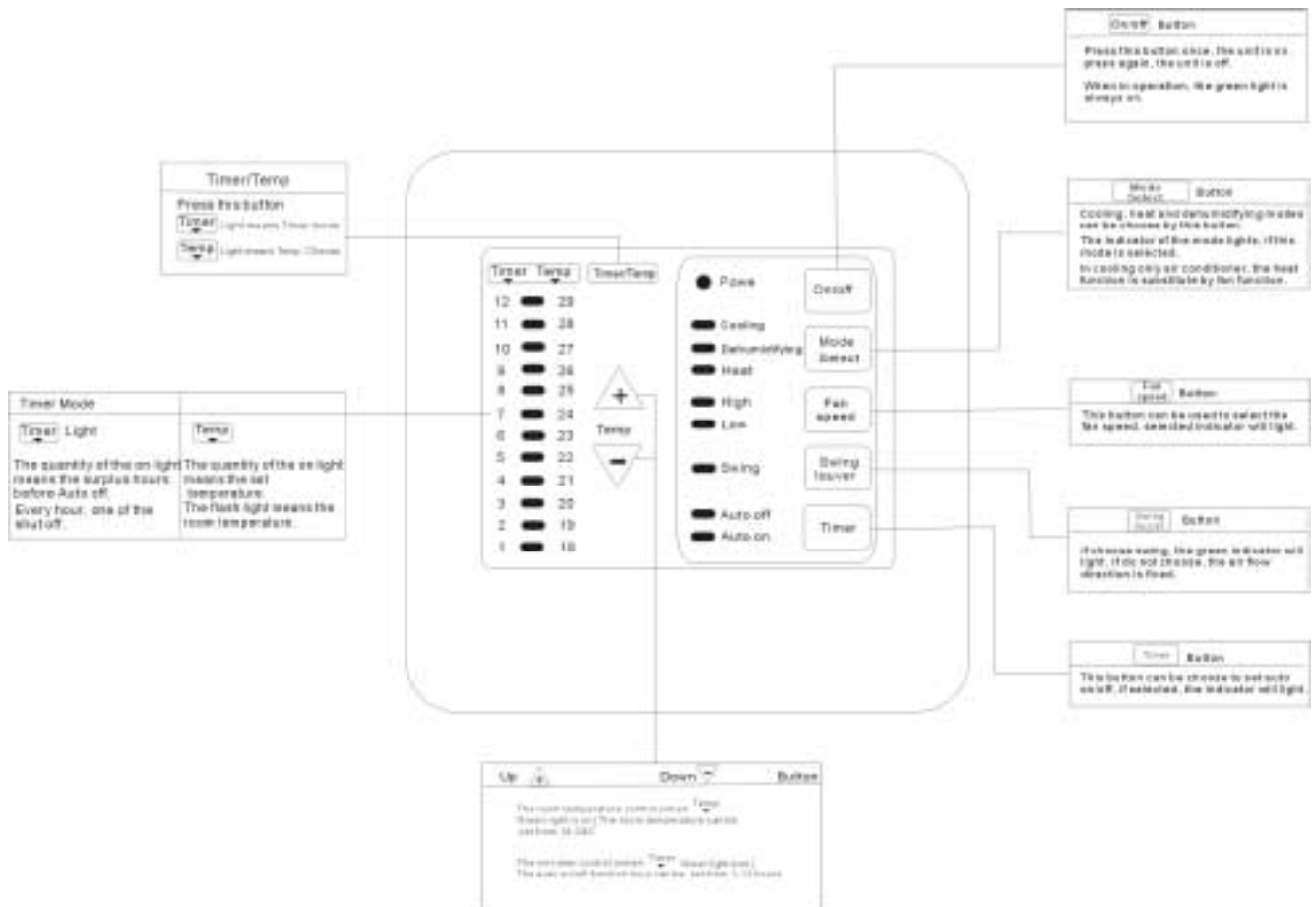
When trouble indication occurs, the unit will stop, press Power button, the trouble indicator light will be off.

13. Technology data

- 1) Power: Main controller board 1ph AC220V $\pm 20\%$ 50Hz $\pm 1\text{Hz}$
Main control DC3V Voltage range: 2.4~3.3V
- 2) controller working voltage range: AC 220V $\pm 10\%$, frequency range: 50Hz $\pm 5\%$
Compressor output controller: AC 220V $\pm 10\%$, frequency range: 50Hz $\pm 5\%$, Touch point current: 30A
Fan output controller: AC 220V $\pm 10\%$ frequency range: 50Hz $\pm 5\%$, touch point current: 6A
Four-way valve controller: AC 220V $\pm 10\%$, frequency range: 50Hz $\pm 5\%$, touch point current: 6A
- 3) Working temp.: ,main controller $-10^\circ\text{C} \sim 70^\circ\text{C}$
- 4) Time precision: 1h $\pm 1\text{min}$
- 5) Temperature precision: $\pm 1^\circ\text{C}$.

三. KF(R)-75LW/A(D)、KF(R)-75LW(/D)、KF(R)-120LW(/D) control function

一) . Panel introduction



二) . Indoor unit control

1. Auto mode

- 1) When $T_a \geq 25^\circ\text{C}$: choose cooling mode automatically, set temperature is 24°C ;
- 2) $21^\circ\text{C} \leq T_a < 25^\circ\text{C}$: choose dehumidifying automatically, set temperature is 22°C ;
- 3) $T_a < 21^\circ\text{C}$: choose heat automatically, set temperature is 23°C .

Note: in auto mode, there is nothing shown on the panel.

2. Cooling mode

2.1 Temperature control: $18^\circ\text{C} \sim 29^\circ\text{C}$;

2.2 Compressor control:

2.2.1 3 minutes protection

- 1) 3 minutes delay function of first usage of the compressor.
- 2) 3 minutes interval when restarting the compressor.

2.2.2 When T_a is higher than T_s , the compressor runs, if T_a is equal or lower than T_s , the compressor stops.

2.2.3 When in inspection function, the compressor stops.

2.2.4 Anti indoor evaporate frosting function:

- 1) when the compressor continue working for 16 minutes, if the indoor coil thermistor is lower than 1°C the compressor will stop.

2) When any one of below conditions meet, the function cancel:

- a Indoor coil temp. rise to 10°C;
- b Ta is equal or lower than set temperature;
- c The unit stops or working mode changed.

Note: Anti frosting temperature changes from +1°C to -3°C.

2.2.5 Indoor evaporate anti frosting function:

Auto operate: When the compressor works for 3 minutes, if indoor coil thermistor is equal or lower than -15°C, and this last 3 minutes, this protection function starts automatically.

Operate period: The compressor will stop for 6 minutes, and then restart, within 6 minutes of the compressor's working, if this happen again, the unit will stop and trouble indicator signal will show.

Indoor fan control: choose fan speed through the indoor panel, when the outdoor unit is under abnormal inspection period, fan speed is always in low flow.

Swing louver control: the swing louver is controlled through indoor panel.

Outdoor unit abnormal inspection: the compressor continues working for 3 minutes, indoor coil temperature is at least lower 5°C than room temperature, if this difference do not last for one minute, indoor fan will change into low flow automatically. After 5 minutes, if the difference is still not in this range, it means outdoor unit is abnormal, and then the compressor will stop. This period will show on panel.

2.2.6 Over heat protection: see page 47 outdoor unit control. If outdoor coil temperature rise to 68°C, the indoor coil temperature will remain a lower temperature: 7-12°C

3. Dehumidifying mode

3.1 Temperature control: the same as cooling mode

3.2 The compressor control:

3.2.1 Compressor 3 minutes protection: the same as cooling mode

3.2.2 When in inspection function, the compressor stops.

3.2.3 When room temperature is lower than 18°C, dehumidifying mode don't work, when room temperature is higher than 10°C, the compressor will begin a intermittent work, the working or stop time is decided by Rt. (Rt = Ts – Ta) (The compressor should have worked for 3 minutes at least.)

- a $RT > 28^{\circ}\text{C}$, and higher than Ts, the compressor continue to work for 6 minutes, and stop for 3 minutes.
- b $26^{\circ}\text{C} < RT < 28^{\circ}\text{C}$, and high than Ts, the compressor continue to work for 4 minutes, and stop for 3 minutes.
- c $24^{\circ}\text{C} \leq RT \leq 26^{\circ}\text{C}$, and high than Ts, the compressor continue to work for 2 minutes, and stop for 3 minutes.
- d $RT < 24^{\circ}\text{C}$, and high than Ts, the compressor will stop for 3 minutes.
- e Ta is equal or higher than Ts, the compressor will stop for 10 minutes.

3.3 Indoor fan control:

When the compressor works, indoor fan is in low flow mode, and the air flow can not change by the panel, when the compressor stops, indoor fan stops.

3.4 Swing louver:

The action is the same as in cooling mode. When the compressor stops, the swing louver also stops.

3.5 Outdoor unit abnormal inspection: in dehumidifying mode, this function do not work.

4. Heat mode

4.1 Temperature control: 18°C~29°C

- 1) When indoor coil temperature is lower than 5°C , go back to initial action, when this do not meet, the unit continue. When the fan stops in the beginning time of heat mode or working in low air speed more than 30 minutes, it will indicates trouble of outdoor, and all relay turn off.
- 2) When outdoor unit trouble inspection is not asked,

4.2 The compressor control:

4.2.1 Compressor 3 minutes protection: the same as cooling mode

4.2.2 The compressor runs when T_a is lower than T_s , when T_a is equal or higher than T_s , the compressor stops.

4.2.3 When in inspection function, the compressor stops.

4.2.4 Over heat protection:

Start-up condition: when the compressor have been in working for 2 minutes, if indoor coil temperature is equal or higher than 70°C , over heat protection runs.

Over heat protection: the compressor stops for 6 minutes, indoor fan works in super low flow mode, then restart, indoor fan works in low flow mode, if within 10 minutes, the indoor coil temperature is equal or higher than 70°C again, the unit shuts down and indicator trouble.

4.3 Indoor fan control: indoor fan is control by set temperature, room temperature and indoor coil temperature.

Action of indoor fan:

- 1) When room coil temperature is lower than 26°C , indoor fan don't run.
- 2) When room coil temperature is lower than 35°C , indoor fan works in weak flow for 5 minutes, low air flow for 2 minutes, and then works as the set air speed.
- 3) When room coil temperature is equal or higher than 35°C , indoor fan works in low air flow for 2 minutes, and then works as the set air speed.

Heating period after the running of the fan: (T_c = indoor coil temperature T_a = room temperature)

When the difference of T_c and T_a reduce from $\geq 5^{\circ}\text{C}$ to $-5^{\circ}\text{C} < T_c - T_a < 5^{\circ}\text{C}$, the fan remain the pre air flow, if the air speed change, the air flow can only be reduced, the electricity heat shuts down.

- 1) When $0 < T_c - T_a < 3^{\circ}\text{C}$, electrical heater shuts down for more than 1 minute, indoor fan stops, otherwise the fan speed changes to low flow.
- 2) When $T_c - T_a \leq 0^{\circ}\text{C}$, indoor fan stops.
- 3) When $T_c - T_a \leq -5^{\circ}\text{C}$, goes into dehumidifying mode.

When $T_c - T_a \geq 5^{\circ}\text{C}$ again, if the fan is in static state, it goes into heat starting process, if the fan is in working, and the electrical heater shuts down not more than 1 minute in $-5^{\circ}\text{C} < T_c - T_a < 5^{\circ}\text{C}$, the fan speed don't change, if it is changed, it can only be reduced. In other conditions, the fan speed works as set air speed.

4.4 Swing louver control: working action is the same as in cooling mode.

4.5 Electrical heater control:

Start-up conditions: (all following conditions meet)

$T_c - T_a \geq 5^{\circ}\text{C}$; $T_s - T_a \leq 3^{\circ}\text{C}$; $T_a \leq 23^{\circ}\text{C}$; indoor coil temperature $\leq 55^{\circ}\text{C}$; electrical heater have been shut down for 1 minute in $-5^{\circ}\text{C} < T_c - T_a < 5^{\circ}\text{C}$, and not in hot starting process, electrical heater can still run.

Stop conditions: (one of following condiiton)

$T_c - T_a \leq 5^{\circ}\text{C}$; $T_a = T_s$; $T_a \geq 26^{\circ}\text{C}$; $T_c \geq 60^{\circ}\text{C}$.

4.6 Clear spare heat function:

After the electrical heater's shutting down, indoor fan works in low flow for 30 seconds, and then stops.

4.7 Dehumidifying control: (see outdoor unit control)

5. Short circuit terminal function of indoor controller:

- OP1: power on 3 minutes delay function in short circuit.
- OP2: cooling only and cooling & heat to choose, short circuit is cooling only type.
- OP3: anti coil frosting function, open circuit is 1°C, short circuit is -3°C.
- OP4: room temperature showing will be cancelled in short circuit.
- OP5: outdoor unit abnormal inspection will be cancelled in short circuit.
- OP6: time-shorten function, the time change from X minutes to X seconds.

6. Indoor unit trouble self diagnosis

Trouble location		Trouble reason
Timer ▽	Temp. ▽	Flash means trouble
12-29		Flash means outdoor unit trouble
11-28		Flash means indoor temp. sensor trouble
10-27		Flash means indoor coil temp. sensor trouble
7-24		Flash means over heat protection
6-23		Flash means frozen protection
2-19 1-18		Light means trouble

When Timer and Temp. indicator flash, and “1-18””2-19” indicator light, when this happen, the unit stops. Press on/off button, trouble indicator is off.

三) . Outdoor unit control

1. Outdoor fan control

Rotary frequency of outdoor fan is controlled by outdoor coil temperature. This control way permits cooling when outdoor temperature is low, or heat when outdoor temperature is high.

2. Outdoor unit control

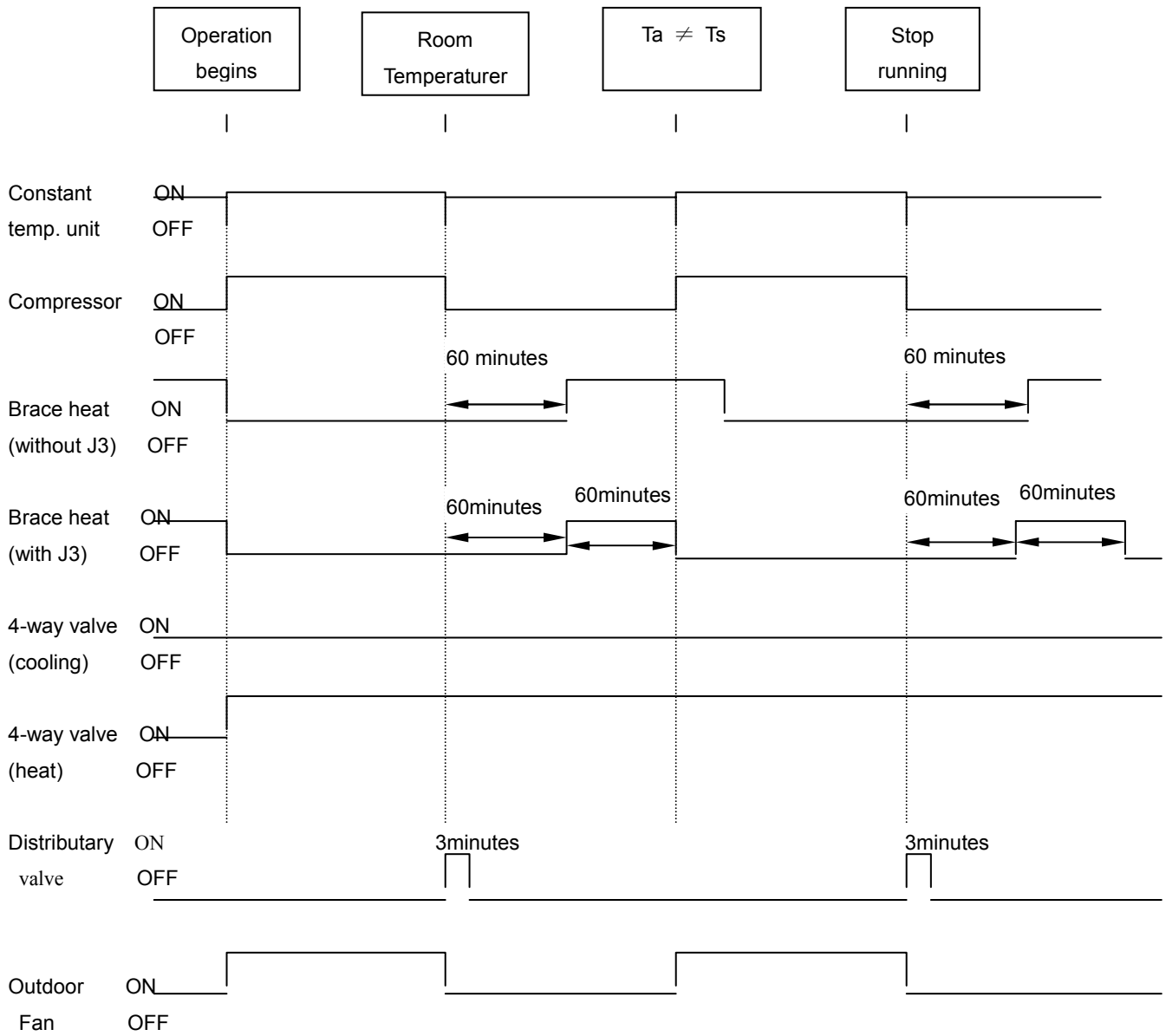
Outdoor units are controlled by indoor unit.

3. Protection:

- 1) if it detects abnormal sign such as reversal phase, off-phase or indoor controller, the outdoor unit stops, and goes into inspection function.
- 2) If protection works, the compressor will stop, 3 minutes later, it will restart, if protection works again, the compressor will stop working and go into inspection function.
- 3) Protection function will be memorized.

- 4) When power switch of indoor control panel is shut, this memory will be clear, but inspection display will go on till the outdoor unit gets the "operation" signal from the indoor unit.

Cooling and heat action as below:

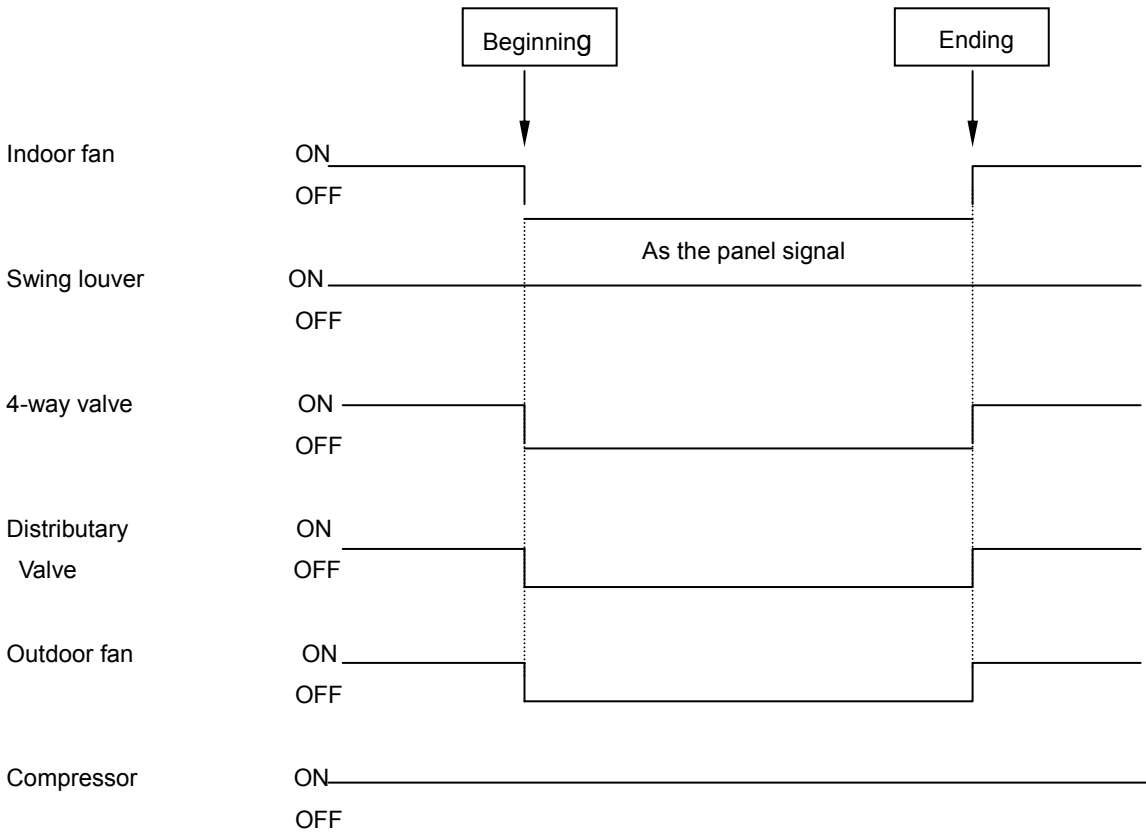


4. over heat protection in cooling mode

Start-up condition: the compressor has been in working for 2 minutes, if outdoor coil is higher than 68°C, the air conditioner is shut down and trouble showing.

Over heat protection: the compressor stop for 3 minutes, and then restart, if the outdoor coil temperature is higher than 68°C again, the compressor shuts down and trouble showed.

Defrosting action in heat mode as below:



Start up condition:

- 1) When all of the following conditions meet, defrosting begin:
 1. The compressor has been in working for more than 7 minutes;
 2. Outdoor coil temperature is lower or equal than 5°C;
 3. Total working time of the compressor is more than 30 minutes, and outdoor coil temperature is lower 8°C than the temperature after the compressor working for 10 minutes.

Note: before the dehumidifying ending, the outdoor coil temperature data after the compressor working for 10 minutes will be save.

- 2) When all of following conditions meet, defrosting works;
 1. The compressor has worked for more than 7 minutes;
 2. Outdoor coil temperature is lower or equal than -5°C;
 3. The compressor’s working time is more than “defrosting interval”.

“Defrosting interval” see Defrosting interval chart.

- 3) When the working time of the compressor is more than defrosting interval, the constant temperature unit restart for 3 times, after 2 minutes of the forth time restarting, if the outdoor coil temperature is equal or lower than -5°C, defrosting begins.

Note: the compressor shut down or defrosting start up will clear constant temperature unit’s on/off counter data.

Frosting period:

- a) Even if the constant temperature unit shut down, defrosting go on.
- b) 4-way valve, distrubutary valve, indoor fan and outdoor fan shut down.
- c) Defrosting interval chart:

Defrosting time (minute)	Next defrosting time (minute)
--------------------------	-------------------------------

≤ 3	120
3~7	80
7~10	60
10~15	40
15	30

Note: ①、 If the unit stops in defrosting period, next defrosting interval is 50 minutes.

②、 Defrosting ends, the total working time of the compressor will be clear.

4) Defrosting ends condition: (when any one of following meet)

1. Defrosting continue working for 15 minutes.
2. Outdoor thermistor is equal or higher than 22℃ within the first 75 seconds of the defrosting beginning.
3. Outdoor thermistor is equal or higher than 22℃ after 75 seconds of the defrosting beginning.
4. Defrosting period, the power switch is on off butoon.

5) Indoor unit abnormal inspection in defrosting period:

If following condition occurs, the compressor will stop, indicator show trouble.

1. $T_a - T_c \leq 5^\circ\text{C}$, continue time is more than 30 minutes.
2. $T_c - T_a \leq 5^\circ\text{C}$, continue time is more than 20 minutes.

5. Controller

1) Distributary valve control:

① Cooling:

1. When anti frosting function lead to the unit stopping, distributary valve opens, when the compressor stops for more than 1 hour, distributary valve shuts down.
2. When distributary valve is shut down, the compressor stops, distributary valve opens and last for 3 minutes.

② Heat:

1. First power on, or the compressor open for more than 30 minutes and restart, if outdoor coil temperature is equal or higher than 12℃, distributary valve open.
2. When high pressure switch (63H1) works, distributary valve opens.
3. When distributary valve opens for 30 minutes, if high pressure switch restarts, distributary valve shuts down.
4. When operation mode changes or stops, distributary open and last 3 minutes.

Note: distributary valve's existence make it unnecessary to shut down the compressor in high pressure trouble.

③ Dehumidifying: distributary valve shuts down.

2) Brace axis heater control:

- ① Without short circuit board J3, from power on to the compressor runs, (or after 1 hour of the compressor's stopping), the brace axis heater open.
- ② With short circuit board J3, from power on to the compressor runs, brace axis open and operate as the principle of 1- hour- on, 1-hour-off.

6. Service function:

1) Forcible defrosting: when all below condition meet, press SW2 forcible defrosting works.

1. In heat mode;
2. The compressor runs;
3. Lighting tube shows outdoor coil temperature (SW3-1 OFF SW3-2 ON) ;

4. Outdoor coil temperature is equal or lower than 8°C.

Note: forcible defrosting action and ending condition is the same as normal defrosting, but defrosting interval will be 50 minutes.

2) Power on/off function on outdoor controller:

SW1: clear inspection data memorizer (button)

SW2: output state indication and inspection data display switch (button)

SW3: output state item display switch (switch)

3) Time shorten:

Short circuit CN21 can shorten the time as below: (s = second, m = minute)

1. fan control cycle: 30s→3s;
2. 3minute delay: 3m→3s;
4. defrosting maximum time:15m→15s;
5. defrosting interval: 30m→120m→3s→12s;
6. compressor that control distribute on/off: Xm→Xs;
7. brace axis heater runs: 60m→6s

4) Plug function control:

plug name	function	without short circuit board	with short circuit board
J1	Reversal current inspection	not inspection	Inspection
J2	side way valve control	distributary valve defrosting switch	open when distributary valve defrost
J3	brace axis heat	continue heating	1-hour-off 1-hour-on
J4	cooling/heat choose	cooling & heat	cooling

5) service data display:

Through setting SW2 and SW3, lighting tube can display the output state and inspection code, output state will show through lighting tube, inspection code will show through flash.

SW1: turn SW1 to ON, clear inspection code, if this happen in inspecting code period, signal will change to output state indication.

Note: ordinary, SW1 works, independent with SW3, but in reset period, if inspection show reversal phase, SW1 don't work.

SW2: (SW2 pressed ON released OFF)

If SW3-1 and SW3-2 are OFF, press SW2 the indicating data will switch between inspection code and output state, if SW-1 is OFF while SW-2 is ON, press SW2 forcible defrosting occur.

SW3:

Inspection code	Output state	Output state	Outdoor coil temp. (Code)	Defrosting interval (minute)	Compressor working time (minute)
SW3-1	OFF	OFF	OFF	ON	ON
SW3-2	OFF	OFF	ON	OFF	ON
LED	Flash	Light			
LD1	Reversal phase	Indoor controller order compressor to run	1	1	1
LD2	Short of phase	Indoor controller order heat function	2	2	2
LD3	Outdoor sensor	63H1 operation period	4	4	4
LD4	63H2 function	Compressor runs	8	8	8
LD5	51C function	Outdoor fan runs	16	10	10
LD6	26C function	4-way valve works	32	20	20
LD7	Over heat protect	Distributary valve works	64	40	40
LD8	Input loop abnormal in controlled board	Brace axis heater works	128	80	80

7. Outdoor coil temperature calculation

Find out the outdoor coil CODE from about chart and then calculate as following:

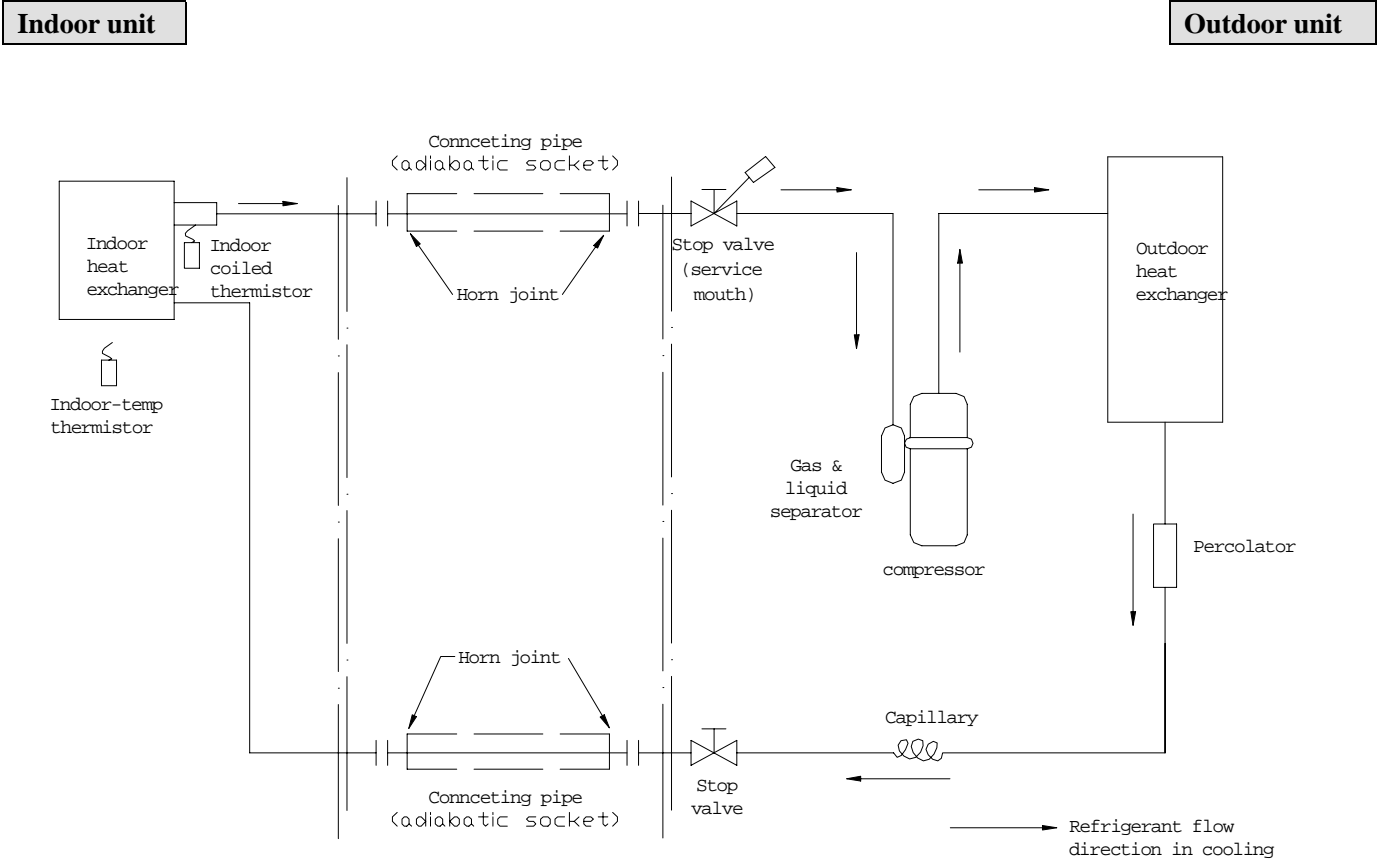
$$\text{CODE} = 2550 / (\text{RT} + 10\text{K})$$

$$\text{So: RT} = 2550 / \text{CODE} - 10 \text{ (k}\Omega\text{)}$$

Outdoor coil temperature can be check out in "temperature sensor specification chart" by corresponding RT.

REFRIGERANT FLOW CHART

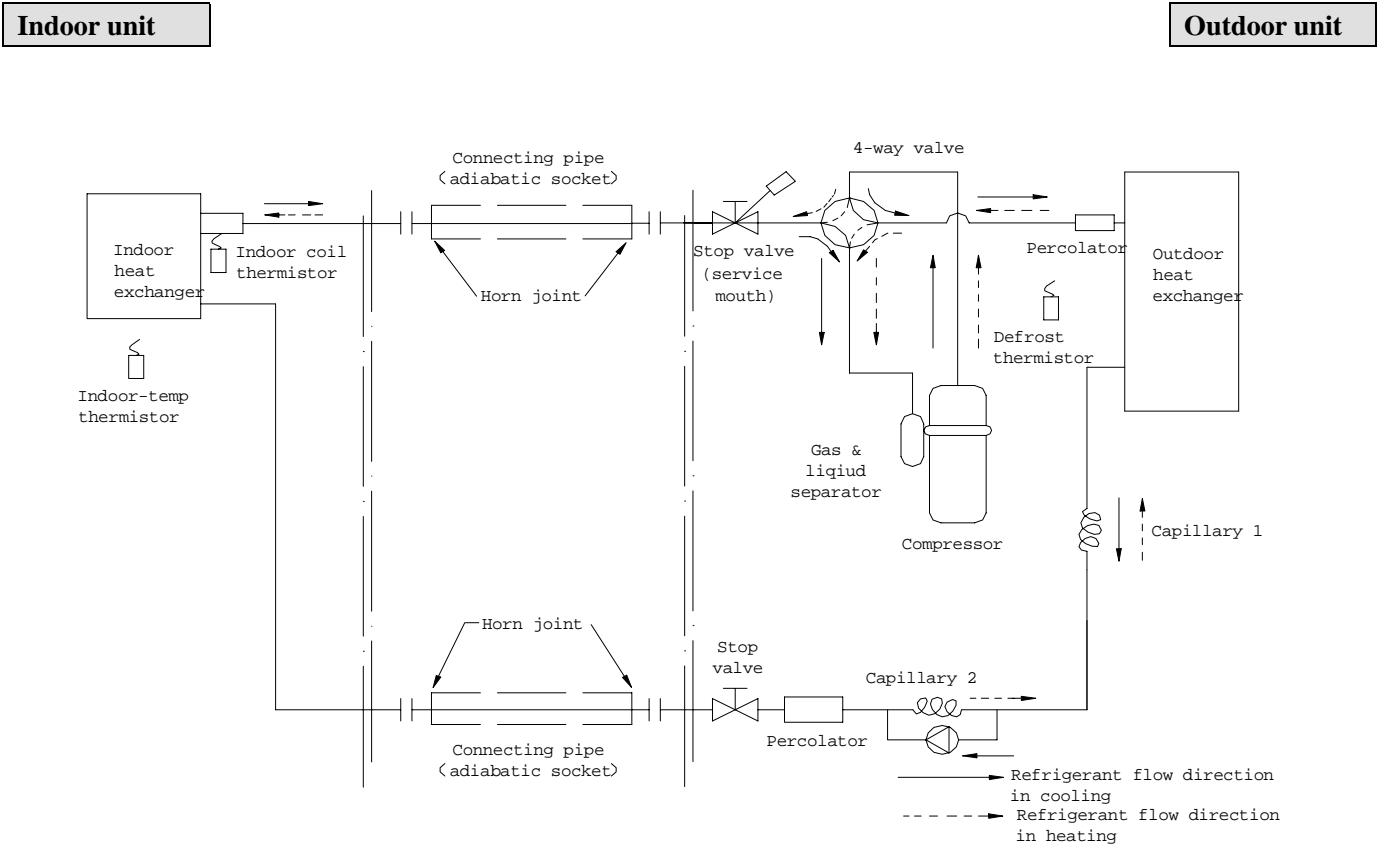
— Cooling Only



Pipeline Specifications:

Model	Gas connecting pipe outer diameter (mm)	Liquid connecting pipe outer diameter (mm)	Capillary Dimension (mm × mm)
9000 BTU cooling only	9.52	6.35	Φ 1.37 × 850
12000 BTU cooling only	12.7	6.35	Φ 1.62 × 900
18000 BTU cooling only	12.7	6.35	Φ 1.80 × 750

二. Cooling & heat



Pipeline Specifications:

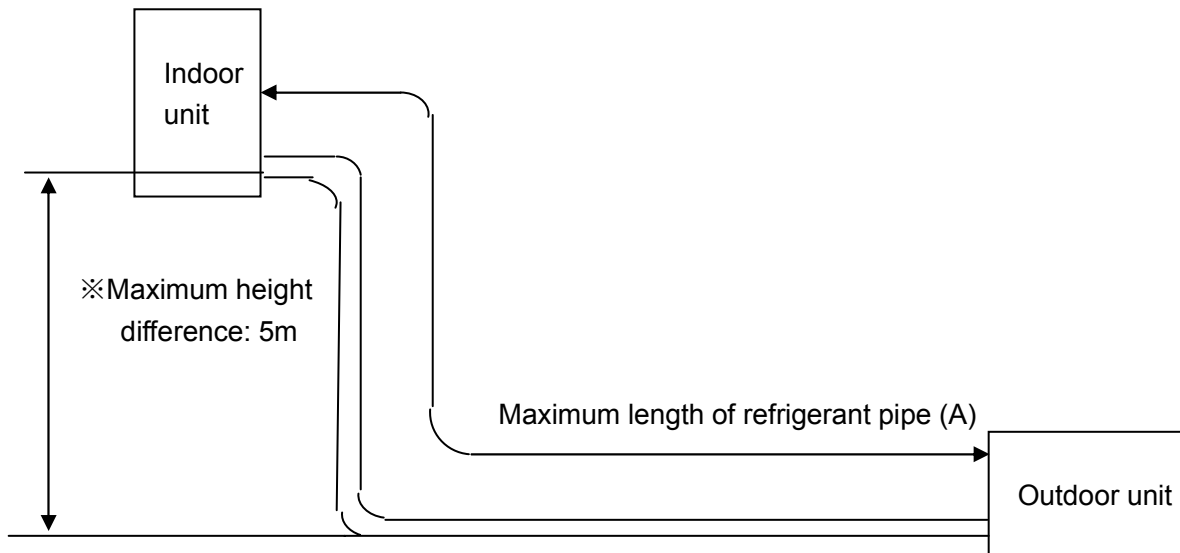
Model	Gas connecting pipe outer diameter (mm)	Liquid connecting pipe outer diameter (mm)	Capillary 1 Dimension (mm×mm)	Capillary 2 Dimension (mm×mm)
9000 BTU cooling & heating	9.52	6.35	Φ 1.37×850	Φ 1.37×350
12000 BTU cooling & heating	12.7	6.35	Φ 1.62×900	Φ 1.62×350
18000 BUT cooling & heating	12.7	6.35	Φ 1.80×750	Φ 1.80×400

Maximum length of refrigerant pipe

Maximum Length of Refrigerant Pipe

Model	Maximum length of refrigerant pipe (A): m	Outer diameter of pipe: mm		Length of Connecting pipe (L): m	
		Gas	Liquid	Indoor unit	Outdoor Unit
9000 BTU	10	9.52	6.35	0.43	0
12000 BTU	15	12.7			
18000 BTU					

Maximum height difference



Replenishment amount of refrigerant (R-22: g)

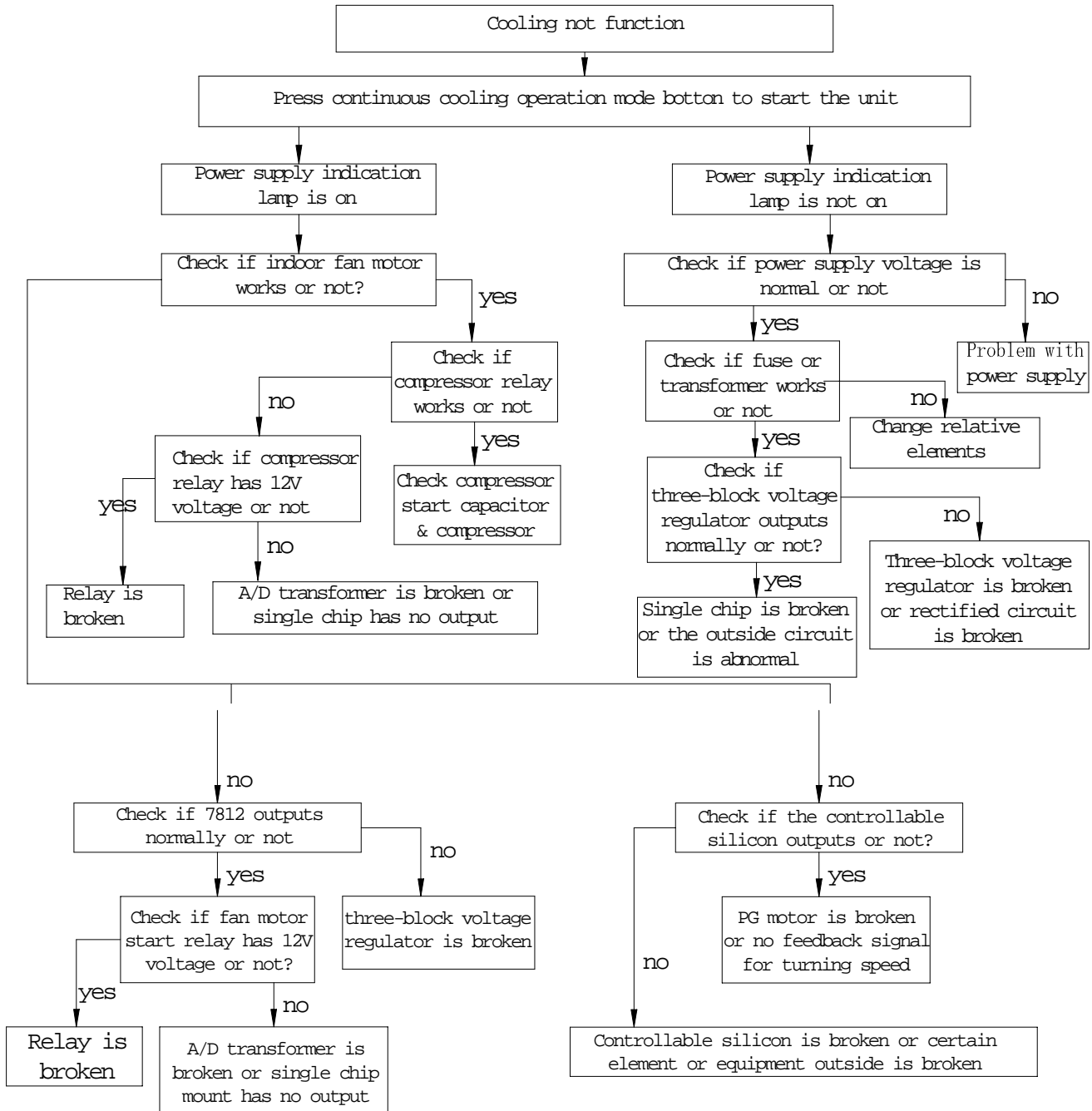
Model	Profiled refrigerant for outdoor unit (Max. 7m)	Length of refrigerant pipe (one way)		
		7m	10m	15m
9000 btu cooling only	900	0	45	120
12000 btu cooling only	800			
18000 btu cooling only	1650			
9000 btu cooling only	850	0	150	400
12000 btu cooling only	1150			
18000 btu cooling only	1800			

Computation: Replenishment amount=15/L×(A-7)

MICROPROCESSOR CONTROL

一、Microprocessor Control

1. Examination flow chart for electric control section of split type air conditioners



2. Disco pound the Principle Chart

2.1 CPU:

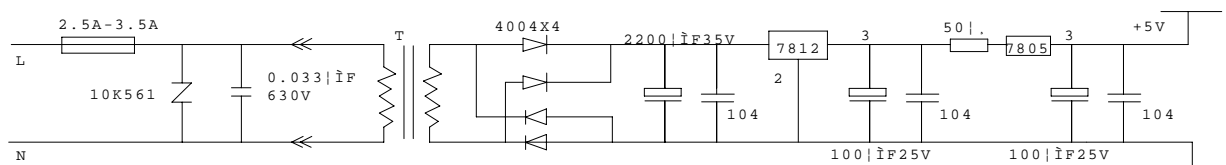
(IC): is the core of the whole electric control board, comprised by many diodes, integrate elements and circuits, such as A/D transformer, D/A transformer, clock, decoder and voltage comparisor, etc.

2.2 Power supply circuit:

Quality of the power supply will directly affect the performance & stabilization of the whole electric control section.

Below is the circuit diagram:

0

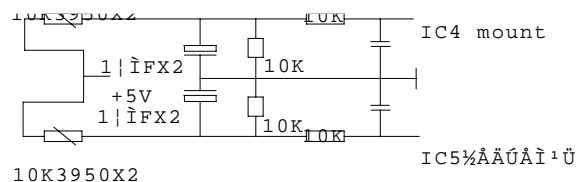


2.3 Sensors:

Sensors can be divided into three types:

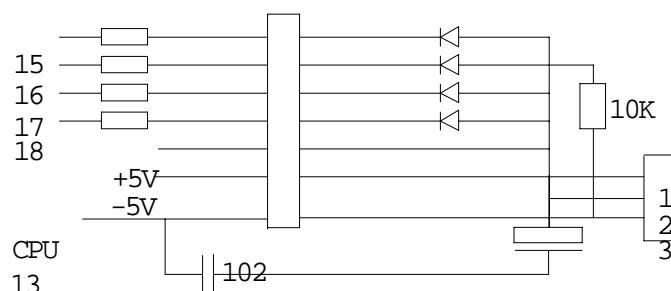
- 1) Room temperature sensor
(Room temperature detecting)
- 2) Indoor coil temperature sensor
- 3) Outdoor coil temperature sensor

} **Anti-frosting & defrosting**



2.4 Indication lamp board.

There are four kinds of indication lamps on the board. They are economical, powerful, timing & operation indication lamps. HS 0038 signal receiver receives signals, then send the signals to CPU for processing, decoding and executing etc. And the indication lamps show clearly which function is going on.



2.5 Stepping motor

- 1) When the unit is switched on, the air-intake grid will turn to the standard position according to the operation mode with a speed of 2500pps. When the unit is switched off, the air-intake grid will turn 149 degree toward the closing direction with the same speed.
- 2) Ways of the air-intake grid swing can be divided into three states of natural, circulation, and stop.
- 3) The work principle of stepping motor is as follows:

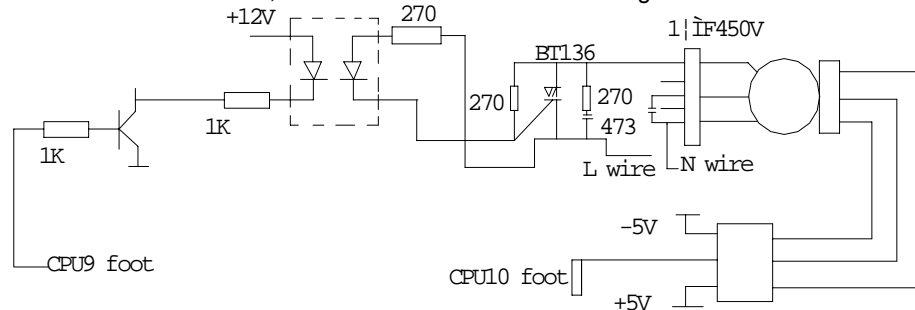
- ① Stepping motor is, in reality, a four-phase motor, the processor outputs four different phases of pulse signals to enable the motor turn, meanwhile control the turning speed;
- ② Pulse signals are output through the four feet of CPU 23.24.25.26, then their directions are reversed by IC 2003 device to control the turning speed and turning angle of the stepping motor.

2.6 PG motor:

PG motor is used as indoor fan motor. its work principle is as follows:

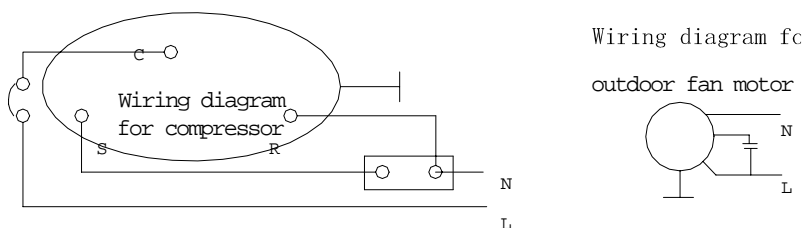
- 1) The circuit, comprised by Q1, D5, D6, R1, R2 triodes, produces pulses, which are sent to CPU for further processing. Then the processed pulses are used to control the turning speed of PG motor.;
- 2) There are HALL elements inside the PG motor. Each round the motor turns, the hall elements will be sensitized to produce three pulses, which will be feedback to CPU to form a feedback circuit, so as to stabilize the turning speed.
- 3) The optical coupling combination

drives the controllable silicon circuit, which is showed as the below diagram:



2.7 Electric control section with powerful electricity.

The section that is in front of the transformer is powerful electricity section, which must be handled with care when doing the repairing.



The CPU drives 2003, 2003 drives the relay, the relay drives the compressor.

3. Function of all the elements and identification of the failures

3.1 Function of the different CPU feet:

Foot 1,2 .for transistor vibrator; Foot 3.for grounding; Foot 4.for room temperature sensor; Foot 5.for indoor coil temp. sensor ; Foot 6 for outdoor coil temp. sensor ; Foot 7 for selection; Foot 8 for grounding; Foot 9 for PG driving; Foot 10 for PG feedback; Foot 11 emergency switch; Foot 12 for ; Foot 13 for signal receiver; Foot 14 for economical lamp; Foot 15 for powerful lamp; Foot 16 for timing lamp; Foot 18 for operation lamp; Foot 19 for four-way valve; Foot 20 for outdoor fan motor; Foot 21 for compressor; Foot 22 for buzzer; Foot 23 for stepping motor 4; Foot 24 for stepping motor 3; Foot 25 for stepping motor 2; Foot 26 for stepping motor 1; Foot 27 for reset;

3.2 Function of all the elements for power supply

RV1 10K561, C10 0.03 μ F/630V, main function of the two elements are for powerful electricity & wave filtering circuit; Function of Fuse 2.5A/250V is to prevent over-voltage & over-current, to protect PCB from damage caused by shorted circuit due to certain damaged element; Function of the transformer with 220V/50HZ input & 14V output is to provide PCB board with liable power supply; Function of D1, D2, D3, D4 diode rectifier is to transform the alternating current provided by the transformer into direct current; C1, C2, C3, C4, C5, C6, C7 are wave-filtering capacitors; Function of the 7812 three-block voltage regulator is to stabilize the direct current to the extent of 12V for the relay's use. Function of 51 0.5W R13 resistance is to limit the current; Function of 7805 three-block voltage regulator is to transform the current-limited 12V voltage into 5V for the use of CPU & PCB board.

3.3 Function of all the elements of the sensors

The function of room temperature sensor is to provide CPU with a standard parameter. CPU converts the standard parameter into the current temperature; Function of C14, C15, C16, C17, R19, R22 (precision) R30, R32 is to form a voltage-dividing, wave-filtering circuit, so as to ensure the precision of the thermistor; Function of RT3, C12, R18, R17, C13 is to form the outdoor coil temp. detector circuit no used currently)

3.4 Function of all the elements of emergency switch

Function of 6x6x6 micro-adjusting switch is to start and close the unit. When you press the button, the circuit is closed, power supply will provide CPU with an impulse, which will enable CPU start to work immediately. SV301, R26, C8 compose a trouble-free impulse transmission circuit. If C8 is in short circuit, the unit can not be shut off.

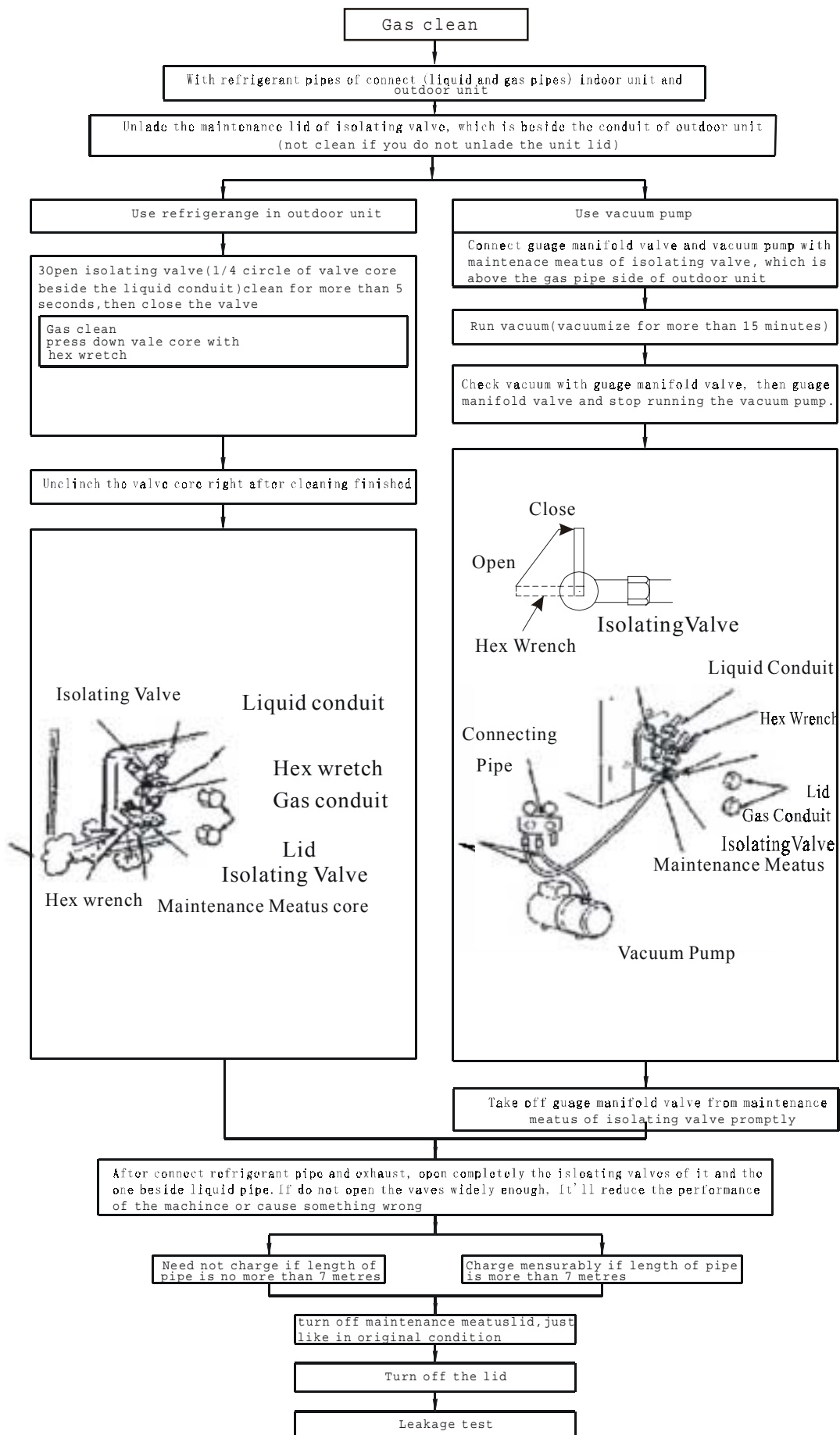
3.5 Functions of all the elements of indicator:

R7, R9, R10, R11 compose a current-limited circuit to prevent LBD from damage due to CPU's high voltage, LBD is used as function indication ; Receiver HS0038, R202, C201 compose a circuit to receive signals, amplify signals and to resist interference., so that signals can be sent completely into CPU for decoding .

3.6 Function of all the elements of stepping motor:

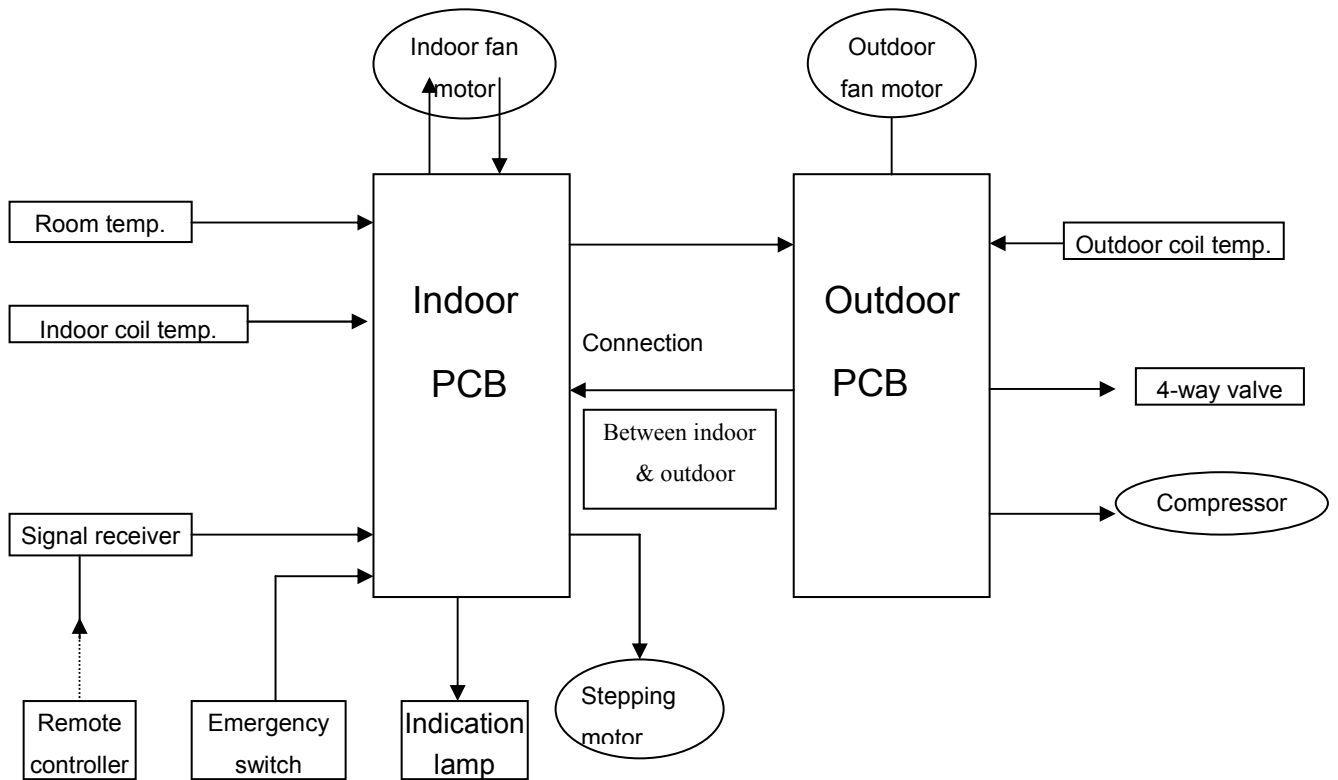
Function of D5, D6, R1, R2, 9013, R4 is to compose a circuit, produces and sends pulse to the chip which will process it to control the speed of PG motor, If Q₁9013 is damaged, speed of PG motor can not be controlled; If Q₂9013 is damaged, PG motor can not work; If optical coupling is damaged, controllable silicon and PG motor can not work Function of R14, R13, C21 is to protect controllable silicon; Function of R12 is to protect optical coupling; Function of R8 is to limit current. The motor can not work if 1 μ F/450V capacitor is damaged; If resistance value of R16 is more than 100K, the PG motor can be look as a true PG motor. When the value of R16 is only 10k, then the PG motor is bogus ; Function of R21, D7, C25 is to compose a auto reset circuit; R28 is a resistance used for selecting function of cooling only or cooling & heating function K1, K2, K3 compose control structure: K1 is 4-way valve, K2 is outdoor fan motor, K3 is compressor.

3.7 Gas clean process of Pipeline

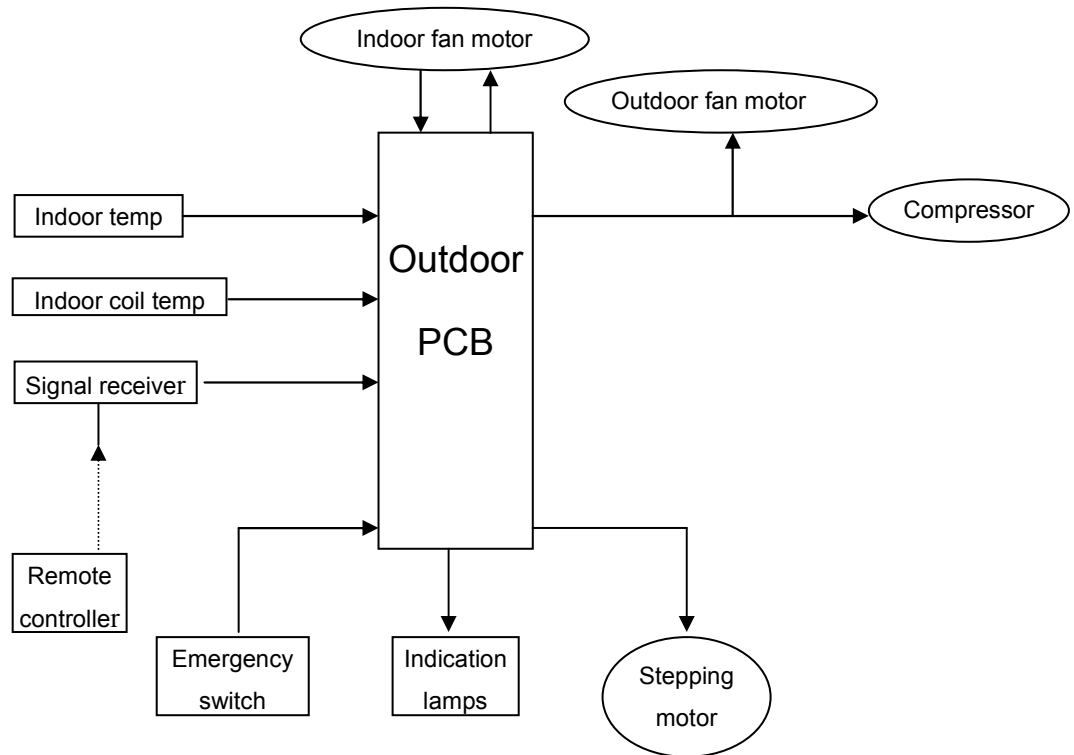


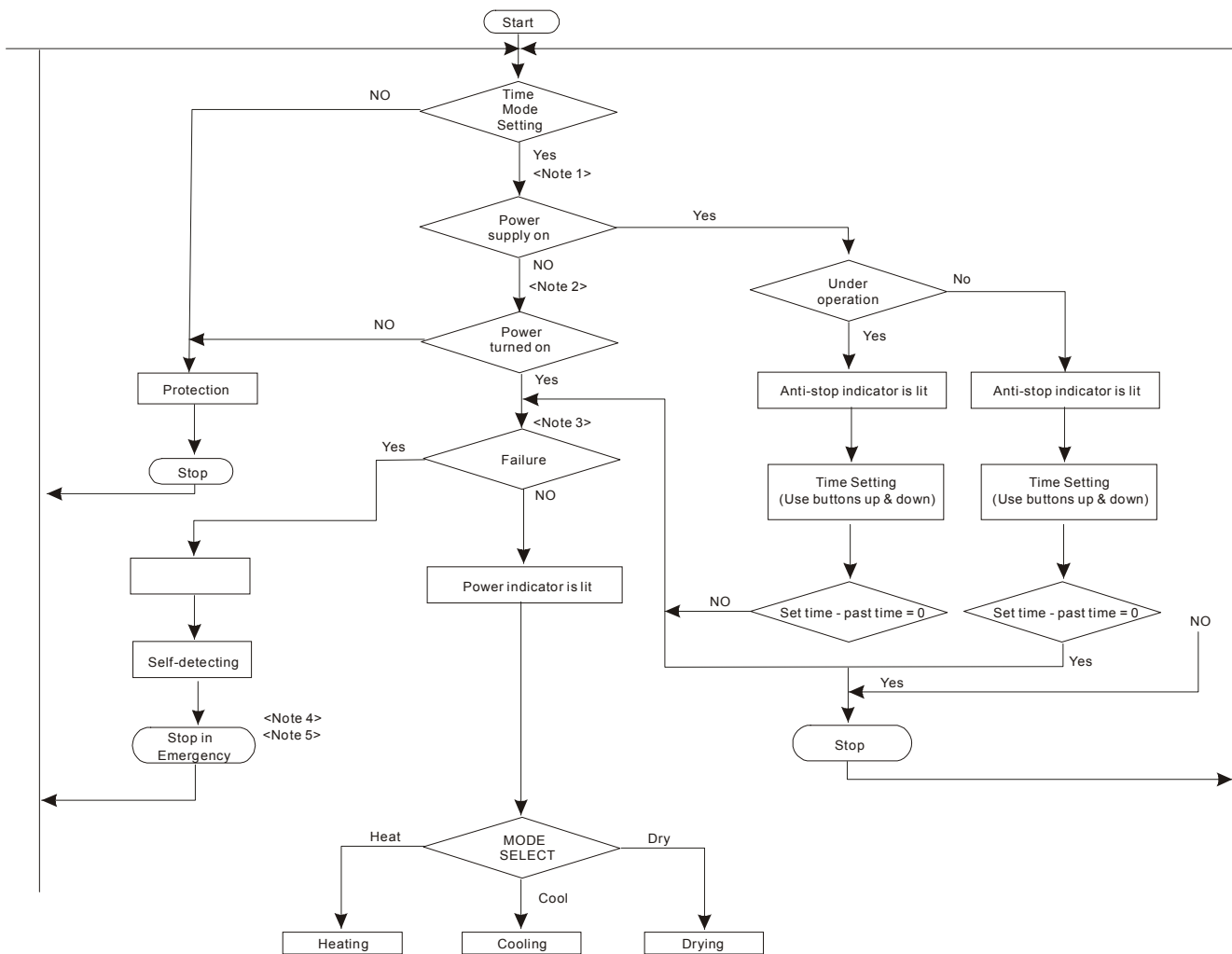
二、Flow Chart

1. Microprocessor control chart for heat pump unit



2. Microprocessor control chart for cooling unit





●附录:

一、制冷剂补充量

- 1、对于 KF(R)-40~60LW(D): 如果制冷剂管道长度 > 7m, 每增加 1m 补充制冷剂 50g;
 - 2、对于 KF(R)-70~120LW(D), 如果制冷剂管道长度 > 7m, 每增加 1m 补充制冷剂 80g。
- 因制冷剂管道长度超过 15m, 则严重影响空调器的制冷效果, 所以制冷剂管道不宜超过 15m。

Pipeline exhaust and leakage hunting

1、Exhaust air

If there is moist air in system, it will lead to an abnormal working of the compressor, so when fixing, the air inside connect pipe should be exhaust out, you have three way to let out the air:

First way: let out the air with its own refrigerant of the unit.

Connect the indoor unit and outdoor unit with connect pipe, tighten the nut, open the gas valve screw cap, liquid valve screw cap, freon charge screw cap, open the liquid valve (rotate 1/4 circle) 0—10 seconds, meanwhile, using the inner six angle spanner to make the freon charge thimble up to outlet the air in the gate of the valve. Stop when your hand feel cold, and the quantity of the exhausted freon should less than 20g.

Second way: using vacuum pump.

Connect the indoor unit and outdoor unit with connect pipe, tighten the nut, 将多用表的歧管阀充注软管连接

于气阀充氟口，将充注软管与真空泵连接，完全打开歧管阀低压手柄，开动真空泵抽真空，开始抽真空时略松开低压阀的配管螺母，检查空气是否进入（真空泵噪音改变，多用表指示由负变为 0）然后拧紧此配管螺母，抽真空完成后，完全关紧复合表低压手柄，停下真空泵，抽真空 15 分钟以上，确认多用表是否指在 $-1.0 \times 1\text{Pa}$ (-76cmHg)，打开高压阀，将充注软管从低压阀充氟口拆下，上紧充氟阀螺母。

第三种：使用制冷剂罐

室内外连接管与室内机组及室外机组连接好，并拧紧接头螺母。使用独立的制冷剂罐将制冷剂罐充注软管与气阀充氟口连接，略微松开室外机液阀上配管螺母，松开制冷剂罐的阀，充入制冷剂 2-3 秒，然后关死。高压侧配管螺母处制冷剂气体流出 10-15 秒后，拧紧配管螺母。从充氟口拆下充注软管，用内六角扳手顶推阀芯，制冷剂放出管子，直至再也听不到噪音，然后上紧阀帽。打开室外机液阀。

2、检漏

对配管各连接部分使用检漏仪或肥皂水进行检漏。若有漏气，用力矩扳手，再次拧紧连接部分，再次检漏，若仍有漏气处，寻找并修复渗漏处，直至漏气停止。

再次打开高压阀，旋转阀柄直至其转不动并适当加力。打开低压阀，旋转阀柄直至转不动，再适当加力，拧紧高、低压阀阀芯螺帽，以备运转。