AKIRA

makes life better

Air Conditioner

Service Manual

MODEL:
AC-CF40CM

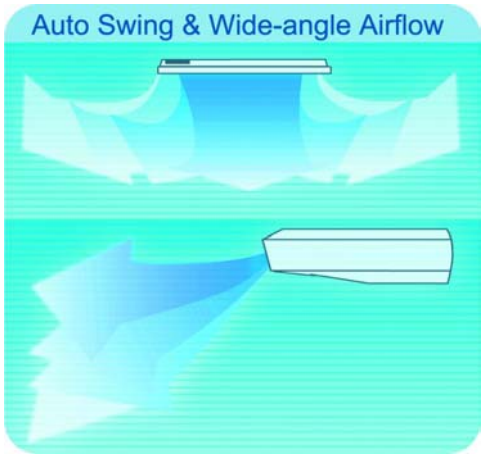
CONTENTS

PRODUCT FEATURES

1. Convenient installation
   a. The ceiling type can be easily installed into a corner of the ceiling even if the ceiling is very narrow.
   b. It is especially useful when installation of an air conditioner in the center of the ceiling is impossible due to a structure such as lighting.

Floor & ceiling type

2. Double auto swing and wide angle air flow
   a. Air flow directional control minimizes the air resistance and produces wilder air flow to vertical direction
   b. The range of horizontal air discharge is widened which secures wider air flow distribution to provide more comfortable air circulation no matter where the unit is set up.



3. Water proof by utilizing the absorbing plastic film on water collector

4. Low noise level plus compact size
   a. Shape of the blades has been improved to prevent noise caused by turbulence

TECHNICAL SPECIFICATION

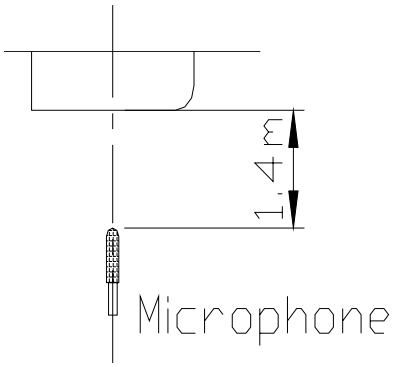
Power supply		Ph-V-Hz	220-240V, 50Hz
Cooling	Capacity	Btu/h	36000
	Capacity	kW	10.5
	Input	W	4100
	Rated current	A	18.6
	EER	Btu/W.h	8.8
Moisture Removal		L/h	3.6
Max input consumption		W	6150
Max current		A	28
Starting current		A	58
Compressor	Type		Scroll
	Capacitor	Btu/h	39602
	Input	W	4000
	Rated current (RLA)	A	17.3
	Locked rotor Amp (LRA)	A	50
	Thermal protector		Internal type
	Capacitor	uF	60uF /450V
	Refrigerator	ml	DAPHN-E FV68S 1697
Indoor fan motor	Input	W	130
	Capacitor	uF	3.5
	Speed (hi /lo)	R/min	1250 /940
Indoor coil	Number of rows		3
	Tube pitch (a) x row pitch (b)	mm	25.4 x 22
	Fin spacing	mm	1.7
	Fin type (code)		Hydrophilic aluminium
	Tube outside dia and type	mm	Φ9.53, innergroove tube
	Coil length x height x width	mm	905* 203* 66
	Number of circuits		5
Indoor air flow (Hi /Lo)		M^3 /h	1400/ 1200
Indoor noise level (Hi /Lo)		dB(A)	49/ 43
Indoor unit	Dimension (W * H * D)	mm	1860 * 600 * 220
	Packing (W * H * D)	mm	1984 * 730 * 370
	Net /Gross weight	kg	32/ 40
Outdoor fan motor	Input	W	290
	Capacitor	uF	10
	Speed	R/min	850
Outdoor coil	Number of rows		2
	Tube pitch (a) x row pitch (b)	mm	25.4 x 22
	Fin spacing	mm	1.7
	Fin type (code)		Unhydrophilic aluminium
	Tube outside dia and type	mm	Φ9.53, bare tube
	Coil length x height x width	mm	715 x 1220 x 44
	Number od circuit		4
Outdoor air flow		M^3/ h	6000
Outdoor noise level		dB (A)	62
Outdoor unit	Dimension (W * H * D)	mm	990 x 960 x 360
	Packing (W * H * D)	mm	1120 x 1090 x 435
	Net Gross weight	kg	99/ 104

Refrigerant type R407C		g	2700g
Design pressure		MPa	2.8 /1.2
Refrigerant piping	Liquid side	mm (inch)	Φ19 (3/4') Φ12.7 (1/2")
	Max. refrigerant pipe length	m	25
	Max. difference in level	m	10
Connection wiring			NO
Plug type			NO
Controller			Remote
Operation temp		^oC	17 ~ 30
Ambient temp		^oC	18 ~ 45
Application area		m^2	60-85
Qty per 20' /40' 40HQ		Pc	28 /66 /76

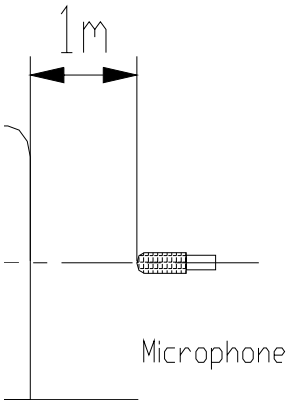
Note:

1. Nominal cooling capacities are based on the following conditions:
    a. Indoor temp: 27^{o}CDB, 19^{o}CWB
    b. Outdoor temp: 35^{o}CDB
2. Nominal heating capacities are based on the following conditions:
    a. Indoor temp: 20^{o}CDB
    b. Outdoor temp: 7^{o}CDB, 6^{o}CWB
3. Actual noise level may differ, depending on the room structure, etc. since these noise values are from an anechoic room.

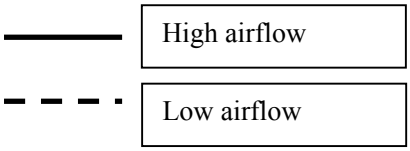
NOISE LEVEL



Ceiling



Floor



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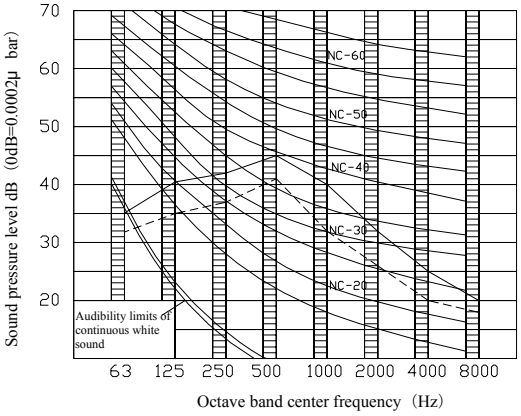
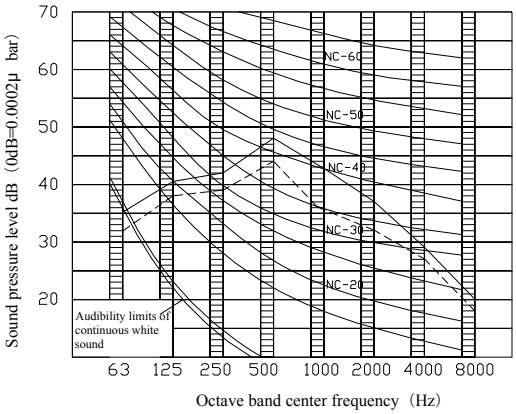


Ceiling

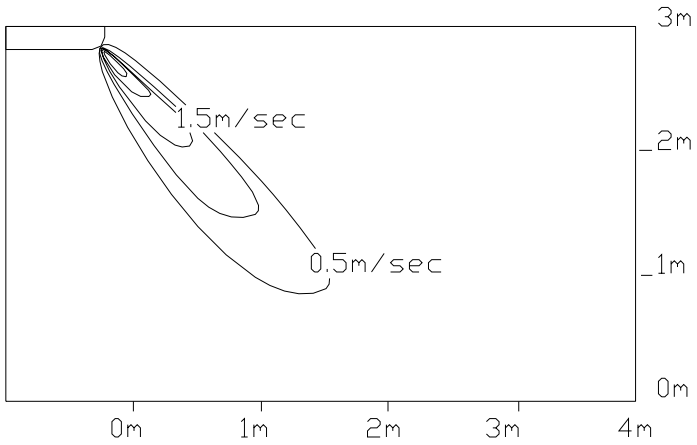


Floor

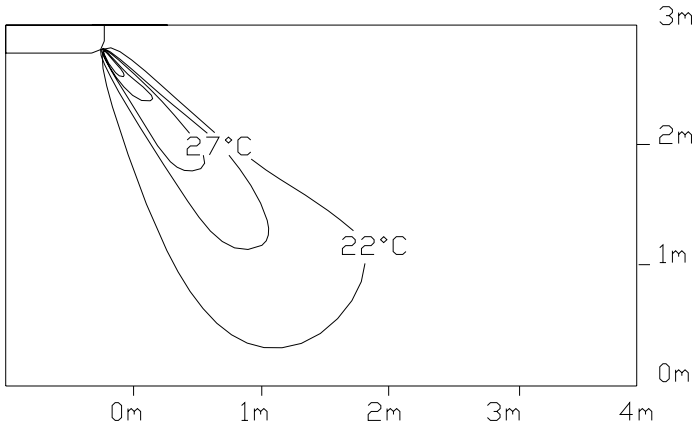
VELOCITY AND TEMPERATURE DISTRIBUTION

Discharge angle 60° (CEILING)

Airflow velocity

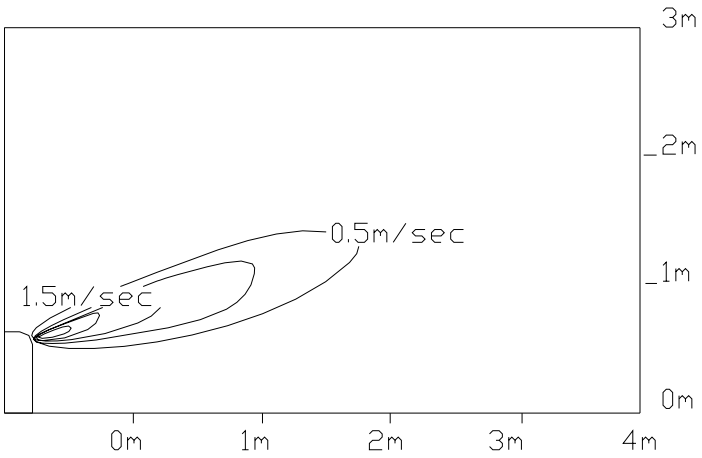


Temperature

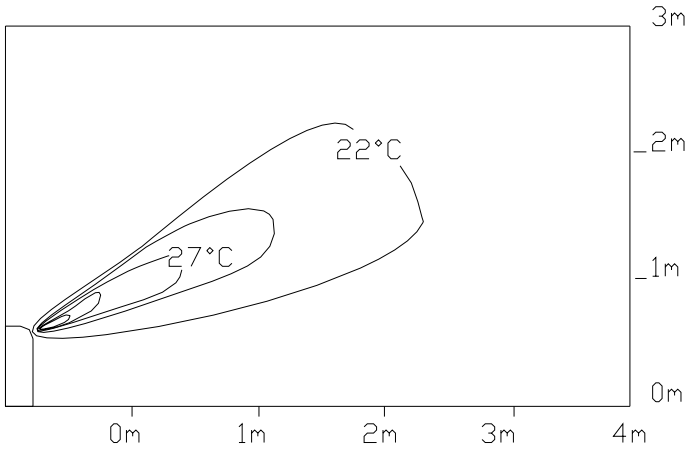


Discharge angle 60° (FLOOR)

Airflow velocity



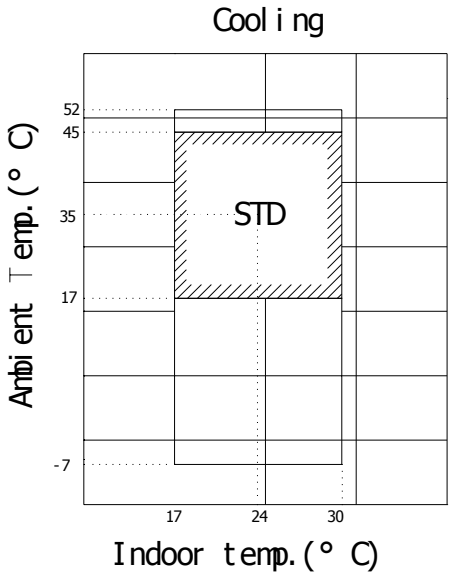
Temperature



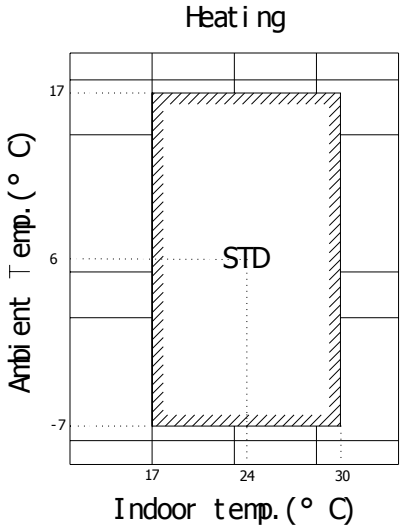
OPERATION RANGE

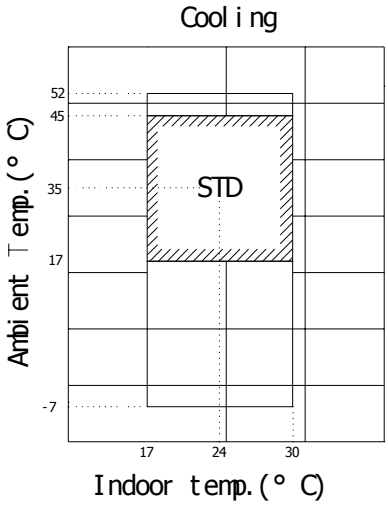
Ensure the operating temperature is in allowable range.

Cooling only



Heat pump



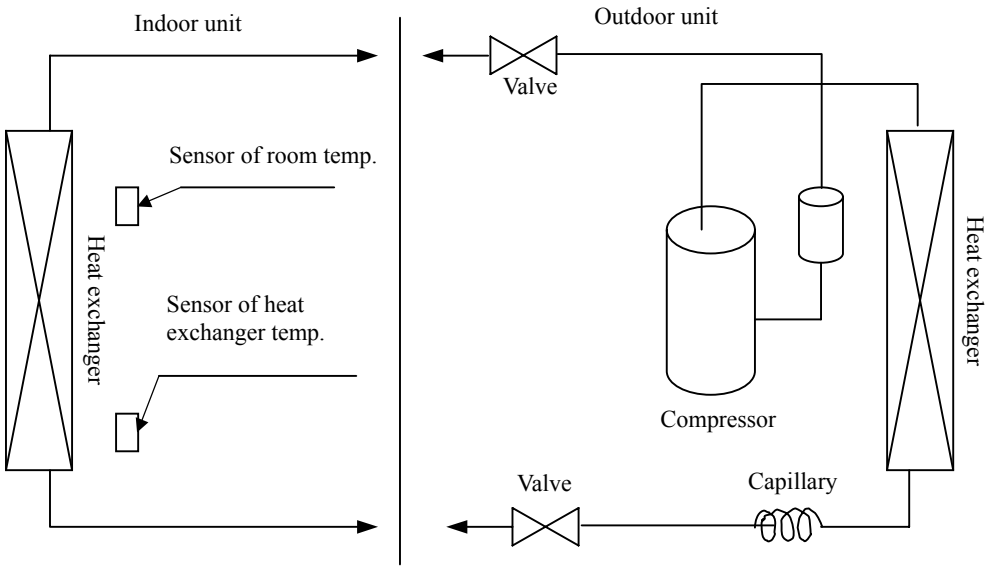


CAPACITY TABLE

COOLING		OUTDOOR TEMPERATURE DRY						
Indoor Conditions		**21ºC**	**25ºC**	**30ºC**	**35ºC**	**40ºC**	**45ºC**	**50ºC**
21ºC D 15ºC W	Total capacity kW	10.19	9.75	9.39	8.86	8.51	8.24	7.98
	Sensitive capacity kW	8.15	7.80	7.51	7.09	6.81	6.59	6.38
	Input kW.	2.58	2.95	3.32	3.69	4.06	4.43	4.80
24ºC D 17ºC W	Total capacity kW	11.16	10.68	10.29	9.71	9.32	9.03	8.74
	Sensitive capacity kW	8.93	8.54	8.23	7.76	7.45	7.22	6.99
	Input kW.	2.73	3.12	3.51	3.90	4.28	4.67	5.06
27ºC D 19ºC W	Total capacity kW	12.13	11.61	11.18	**10.55**	10.13	9.81	9.50
	Sensitive capacity kW	9.71	9.28	8.95	8.44	8.10	7.85	7.60
	Input kW.	2.87	3.28	3.69	**4.10**	4.51	4.92	5.33
32ºC D 23ºC W	Total capacity kW	13.95	13.35	12.86	12.13	11.65	11.28	10.92
	Sensitive capacity kW	13.89	13.28	12.80	12.08	11.59	11.23	10.87
	Input kW.	11.11	10.63	10.24	9.66	9.27	8.98	8.69

REFRIGERATION CYCLE DIAGRAM

Cooling only



ELECTRIC CONTROL FUNCTIONS

Performance Index

No.	Item	Index
1	Applicable Voltage Range	185-253V~, 342-418V~
2	A/C Frequency	50Hz
3	Working environment temperature	-5°C- +43°C

Main Parts Introduction

1. **Indoor Fan**
   a. High speed and low speed.
   b. Breeze speed for anti-cold air.

2. **Outdoor Fan**
   a. High speed and low speed.
   b. Remark: some model just have one speed.

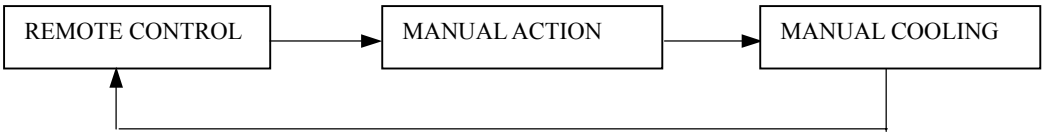
3. **Buzzer**
   a. It will buzz when its driving port in the main chip outputs high level.
   b. It will buzz once when the main frame receives remote start-up signal.
   c. It will buzz once for 1 second when receiving turn-off signal.
   d. It will buzz for 0.5 second once receiving other signal.

4. **Indicator**
   a. There are 4 indicators: operating indicator, timer indicator, water level warning indicator, defrosting indicator and pre-heating indicator (wind-delivery indicator for cooling-only A/C).
   b. LED indicates errors when protection is in effective.

5. **Four-way Valve**
   It is controlled by relays.

Operation Modes and Functions

1. **Manual Operation**
   a. The manual operation mode is controlled through “manual” pad in the wind in-take grid, including such two modes as manual action and manual cooling. Push the manual pad for each switchover, the order for which is shown below:



b. Manual Cooling
   i. Under this mode, no remote control signal will be received.
   ii. The compressor is started up unconditionally and the rotating speed of indoor and outdoor fans is set to be in high and forced cooling operation.
   iii. Under this mode, the buzzer will buzz twice with each lasting 0.5 second at 0.5 interval. During the first 30 minutes of unconditional forced cooling operation, the operation indicator will blink at 0.5Hz. In the process of switchover to manual action mode, the buzzer buzzes for 0.5 second and the indicator is illuminated.
   iv. Under this mode, the corresponding protections are in effective (3- minute delayed start-up, over current, outdoor protection and evaporator low temperature protection.). Corresponding protection will act once any protection is in active. Push "manual" pad once to end this mode and enter the remote control pending status. The buzzer will buzz for 1 second and the indicator turn off.

c. Manual Action
   i. Under this mode, the remote signal will be received and corresponding actions will be taken accordingly upon the receipt of the remote signal.
   ii. On entering this mode, the buzzer will buzz for 0.5 second and the indicator on.
   iii. The system will operate under the auto mode whose temperature is set to be 24°C and at the same time, the wind grille will swing automatically.
   iv. Under this mode, corresponding protections are in effective.
   v. Push " manual" pad to end this mode and switch over to manual cooling mode.

2. Heating Mode

a. Four-way valve opens at once, while defrosting process closes.
b. Condition for the compressor action: (Ts = set temperature, Ta = room temperature)

	Condition	Compressor	Outdoor fan
Room temp. up	Ta> Ts+4℃	Off	Off
	Ta <Ts+4℃	On	On
Room temp. down	Ta < Ts+3℃	On	On
	Ta >Ts+3℃	Off	Off

c. Indoor Fan Action
   i. Fan speed among high/low/auto,(anti-cold air function takes priority).
   ii. Anti-cold air:
   Switchover between fan speed and fine tune can be set according to temperature of evaporator pipe.

	Condition (T= Indoor exchanger temp.)	Indoor fan speed
Indoor exchanger temp. up	T<25°C	Off
	25°C <T<32°C	Breeze
	T>32°C	Setting fan speed
Indoor exchanger temp. down	T> 30°C	Setting fan speed
	15°C <T<30°C	Breeze
	T<15°C	Off

During anti-cold air period, if indoor fan is shut down, then pre-heating/defrosting lamp is on. Once indoor fan starts, pre-heating/defrosting lamp will be off.

iii. Auto fan of indoor fan under heating mode.

	Condition (T =Indoor Temp.- Setting Temp.)	Indoor fan speed
Room temp. up	T <3°C	High
	T >3°C	Low
Room temp. down	T > 1°C	Low
	T <1°C	High

3. Defrost (only available to heating mode)

a. The defrosting of 1~3HP, 4HP(1N) is processed by indoor control board.

i. Defrosting Conditions

- Low temperature defrosting condition:

Accumulated operating time when temperature of outdoor heat exchanger Coil T3 is below -2°C reaches up to over 40 minutes.

- High temperature defrosting condition:

Under high temperature protection of evaporator, the time when outdoor fan is shut down but compressor is not has been accumulated for up to 90 minutes. It is considered that defrosting is performed when either 3.3.1.1 or 3.3.1.2 is met.

ii. Defrosting Action

Four-way valve and outdoor fan are shut down. Indoor fan operates according to anti-cold air function. Compressor keeps on continuously.

iii. Ending Of Defrosting Condition

It is considered that defrosting condition is ended when any of the conditions is met:

- Operating current of compressor reaches 1.5Ie.
- Time of defrosting reaches 10 minutes.
- Temperature of outdoor coil T3 is up to 20°C.

iv. Ending Action of Defrost

- Outdoor fan and four-way valve are open.
- Compressor keeps on continuously.
- Indoor fan acts according to anti-cold air function.
- Defrosting/pre-heating lamp continues to be on until indoor fan starts up.

b. The defrosting of 4~7HP(3N) is processed by outdoor control board.

i. Defrosting Conditions (any of the following conditions is met)

- Under indoor pipe high temperature protection in heating mode, accumulated operating time is up to 90 minutes (if outdoor fan is off and compressor are cut down, time again.)
- When T4≥－8℃, 1min, process the normal defrost mode: compressor operates continue 40 minute, the accumulated time up to 40 minutes when pipe temperature sensor T3≤-2℃ (if compressor is off, time again); when defrosting ends, check T4 again.

ii. Defrosting Action

- When defrosting, the outdoor four-way valve is power off, defrosting valve is power on, outdoor fan is off, compressor operate continue, indoor fan operates according to anti-cold air condition in heating mode. If indoor fan is to be off, cut down the electric auxiliary heater and after 15 seconds cut down indoor fan.

iii. Ending Action of Defrost (any of the following conditions is met)

- Time of defrosting reaches 10 minutes.
- Temperature of outdoor coil T3 is up to 20°C

iv. Ending Action of Defrost

- Operate in normal heating mode. After defrost stops, indoor fan starts to operate according to anti-cold air condition.

4. Cooling Mode

a. Four-way valve is closed.

b. Conditions for the compressor and outdoor fan action (Ts = set temperature, Ta=room temperature)

	Condition	Compressor	Outdoor fan
Room temp. up	Ta > Ts+1	On	On
	Ta <Ts+1	Off	Off
Room temp. down	Ta > Ts	On	On
	Ta <Ts	Off	Off

c. Action of Indoor Fan

i. HIGH/LOW/AUTO fan can be switched over for your comfort.

ii. Auto fan under cooling mode.

	Condition (T=Indoor Temp.-Setting Temp.)	Indoor fan speed
Temp. up	T<4°C	Low
	T>4°C	High
Temp. down	T> 1°C	High
	T<1°C	Low

5. Dehumidifying Mode

a. Dehumidifying mode is the cooling operation, under which the indoor fan is high and outdoor fan is low.

b. Protective condition is active.

6. Auto Mode

a. Under auto mode, the indoor fan is set to be auto (refer to auto fan under cooling, heating).

b. When entering auto mode, the heating, fan only or cooling operation will be automatically chosen according to the room temperature Ta and the set temperature Ts.

i. When Ta < Ts -1°c, it performs the heating operation with a set temperature of Ts -1°c (refer to the heating mode). However the cool only model will be in low fan.

ii. When Ts +2°c ≥ Ta ≥ Ts -1°c, control according to cooling auto fan with a set temperature of 23°c.

iii. When Ta > Ts +2°c, it performs the cooling operation with a set temperature of Ts (refer to the cooling mode).

c. After one mode is chosen, if the condition Ta > Ts+1°c or Ta < Ts - 1°c lasts for 15 minutes, meanwhile the compressor doesn't start up within consecutive 15 minutes, the operation mode will be re-chosen according to the Ta and Ts.

d. Protective condition is active.

7. Fan Only Mode

a. Under this mode, four-way valve, compressor and outdoor fan are shut down.

b. High/Low/Auto fan can be switched over through manual control. Auto fan will be controlled in line with cooling auto fan with temperature set to be 23°C.

c. After entering fan mode, the operating indicator is on. If the model is cooling only mode, fan indicator is on at the same time.

Other Functions

1. **LED Display**

   Operation lamp, timer lamp, defrosting/pre-heating lamp, and water level alarm lamp.

   a. **Operation Lamp**

      When the operation is recovering, it will blink at 1 Hz.
      After the unit is on, the lamp will keep on.
      After the unit is off, the lamp will be off.
      When the unit is switched over from manual cooling to remote control, the lamp will be off.

   b. **Timer Lamp**

      During timer operation, it will be on.

   c. **Defrosting/Pre-Heating Lamp**

      When heat pump model performs defrosting or anti-cold air, it will be on.

2. **Timer**

   Refer to remote controller manual for detail operation.
   Note: The timer is valid for one operation of the A/C.

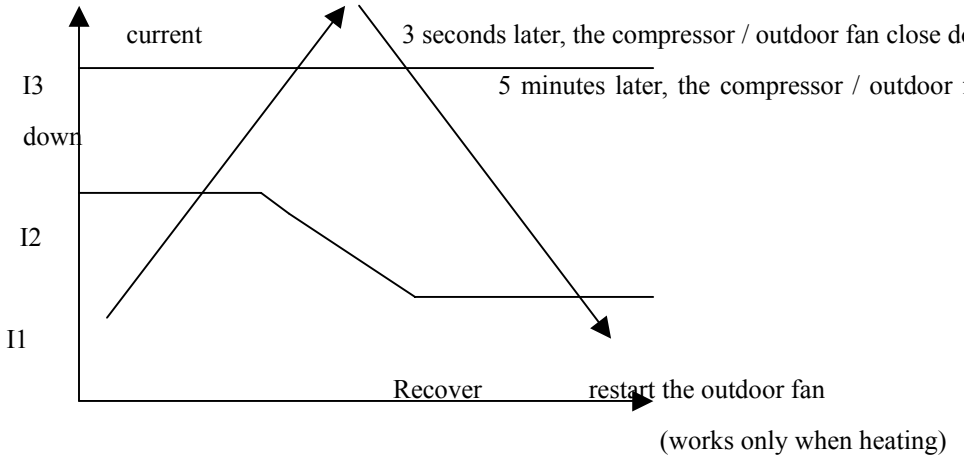
TROUBLE SHOOTING

1. Protective Function

a. 3-minute delay for the compressor start-up.
At the beginning of energizing or after the stop of the compressor, 3-minute delay will be needed to start the compressor.
When switchover between cooling/heating mode, the compressor stops automatically.

b. Compressor current overload protection

i. 3HP and 4HP(1N) compressor current examination and action



Remark :Ie: rating current; I_1:1.3 time Ie; I_2:1.5 time Ie; I_3:2.0 time Ie.

- The compressor and outdoor fan closed for protection purpose will restart after 3 minutes.
- During the protection, the indoor fan continues working in a set speed, while the anti-cold air function when heating and the compressor will be 3 minutes delayed to shut down for protection.
- When there are 4 times compressor protection within one hour, the A/C will be shut down, meanwhile the operation light and timer light will be turned on, the defrosting light flashes in a frequency of 0.5Hz. This situation will be recovered only when power is switched off.

ii. If AC don't check the compressor current through electric control system, then use compressor self current protection.

iii. 4HP(3N) and 5HP compressor current is checked by outdoor main board. The protection principle is as following:
In any case, after the compressor starts, if

- Only in heating mode, when current is higher than 1.5Ie, then outdoor fan will shut off. When compressor current is less than 1.3Ie, then restart outdoor fan and recover operation.
- When current is higher than 1.5Ie and time is up to 20seconds, compressor and outdoor fan will shut down. At the same time, cut down outdoor protection communication wiring, protection malfunction will be indicated by indoor unit and 3minutes later restart compressor.

c. Evaporator protection against high temperature(heating mode)

Only available to heating mode, including heating mode, heating operation under auto mode.

※ Note: During protection, the indoor fan continues operating at a setting speed, while the anti-cold air function of heating and the compressor will be 3 minute delayed to shut down for protection.

d. Evaporator Protection against low temperature (cooling mode)

i. When the evaporator pipe temperature ≤ 3°c and this lasts for 3 minutes, the compressor and outdoor fan will be shut off.

ii. When the evaporator pipe temperature ≥ 7°c, it recovers.

iii. The restart of the compressor shall execute the delay protection.

e. Anti-cold air protection

Only available to heating mode, including heating mode, heating operation under auto mode.

f. Condenser high temperature protection

i. Only available to cooling (incl. cooling mode, cooling operation under auto mode) and dehumidifying mode.

ii. Delay protection should be performed when the compressor restarts.

g. Outdoor protection

Only 3HP has outdoor protection function.

2. Self-diagnosis

a. Indoor unit

No.	Type	Contents	LED Flashing	Remark
1	Protection	Over current protection of the compressor occurs 4 times in 1h	Lamps of operation, timer, defrosting (only fan) flashing simultaneously at 5Hz.	Whole unit is shut down. It cannot recover unless power is cut off
2	Protection	Outdoor protection (absent phrase, phrase sequence and temperature protection)	All lamps flashing at 5Hz	Recover automatically after errors are eliminated (For T3 malfunction of 5HP, can't recover automatically)
3	Error	Room temperature sensor checking channel is abnormal	Timer lamp flashing at 5Hz	
4	Error	Evaporator sensor checking channel is abnormal	Operation lamp flashing at 5Hz	
5	Error	Condenser sensor checking channel is abnormal	Defrosting lamp flashing at 5Hz	
6	Error	Temperature fuse is melt(reserved)	Operation lamp and timer lamp flashing at 5Hz	

b. LEDs for the indication of outdoor trouble (3 ~ 3.5HP, 3 phase)

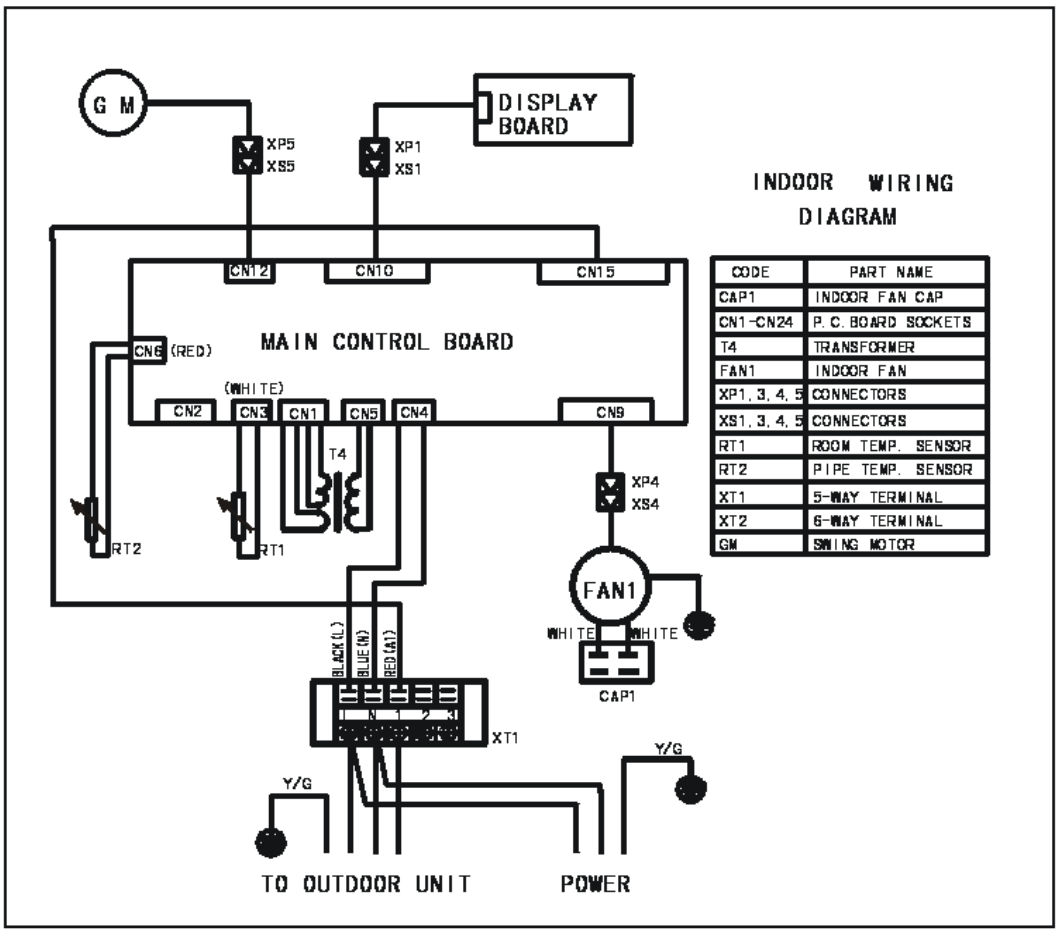
Type	Contents	LED1	LED2	LED3
Normal	Ok	Off	Off	On
Protection	Phase sequence error	On	Off	On
Protection	Overload of current	Off	On	On
Protection	Lack of phase	On	On	On
Protection	Protection of pressure	On	On	On

c. LEDs for the indication of outdoor trouble (4 ~ 7 HP, 3 phase)

Type	Contents	LED1	LED2	LED3
Protection	Phase sequence	Flash	Off	Off
Protection	Lack of phase	Flash	Off	Off
Protection	Protection of pressure	Flash	Flash	Off
Protection	Overload of current	Off	Off	Flash
Protection	Open-circuit and short-circuit trouble of T3	Off	Flash	Flash
Protection	Open-circuit and short-circuit trouble of T4	Off	Flash	Off
Protection	High temperature protection of condenser	Flash	Flash	Flash

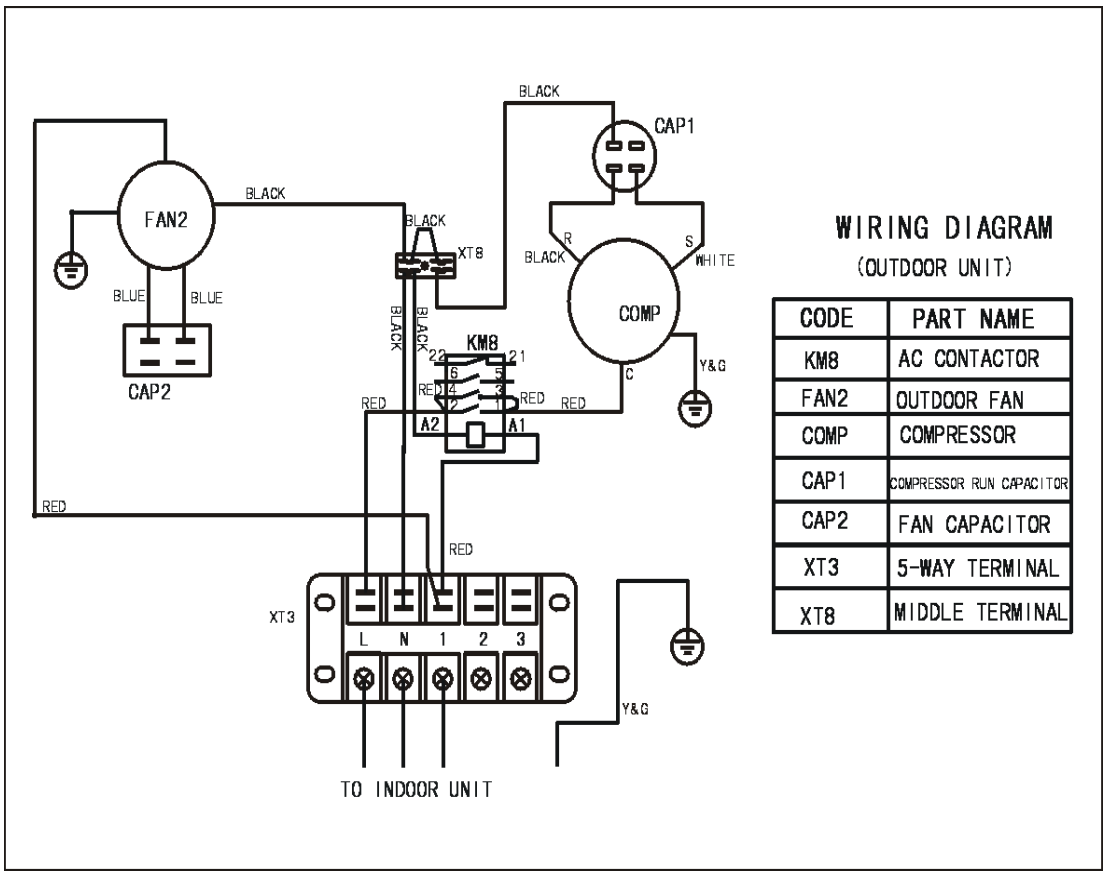
WIRING DIAGRAM

Indoor Unit



CODE	PART NAME
CAP1	INDOOR FAN CAP
CN1-CN24	P.C.BOARD SOCKETS
T4	TRANSFORMER
FAN1	INDOOR FAN
XP1, 3, 4, 5	CONNECTORS
XS1, 3, 4, 5	CONNECTORS
RT1	ROOM TEMP. SENSOR
RT2	PIPE TEMP. SENSOR
XT1	5-WAY TERMINAL
XT2	6-WAY TERMINAL
GM	SWING MOTOR

Outdoor Unit



WIRING DIAGRAM
(OUTDOOR UNIT)

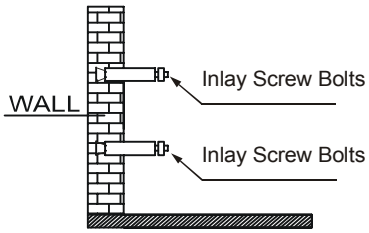
CODE	PART NAME
KM8	AC CONTACTOR
FAN2	OUTDOOR FAN
COMP	COMPRESSOR
CAP1	COMPRESSOR RUN CAPACITOR
CAP2	FAN CAPACITOR
XT3	5-WAY TERMINAL
XT8	MIDDLE TERMINAL

INSTALLATION

1. Installation of indoor unit

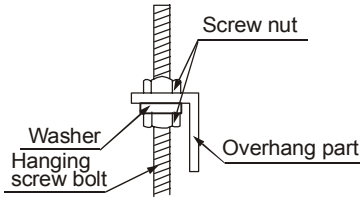
a. Wall Mounting Installation :

Please use the level indicator when install the unit on the floor by wall mounting.
Keep the unit perpendicular to the floor.
Use inlay screw blot or flaring screw bolt to install.



b. Ceiling Installation :

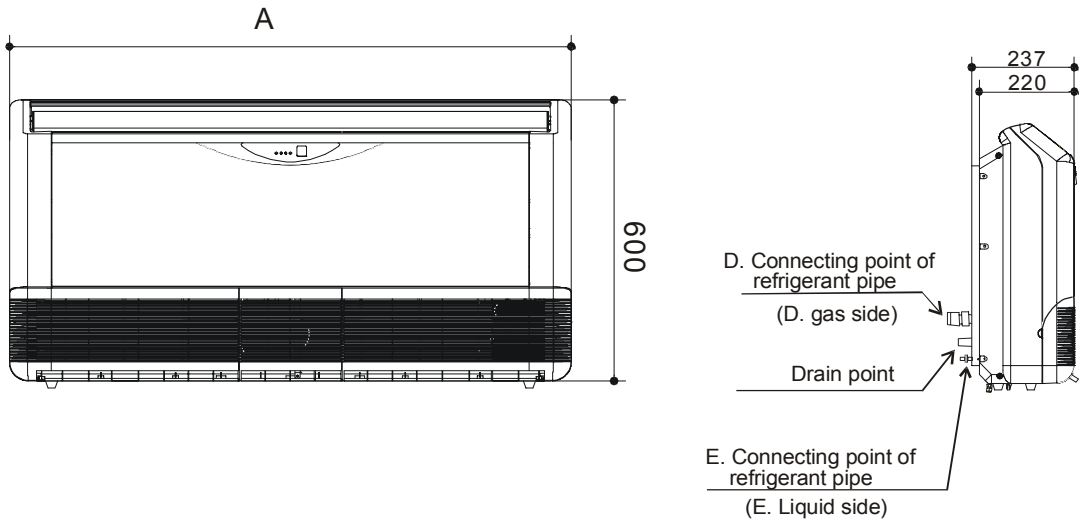
Overhang the indoor unit onto the hanging screw bolts with block.
Position the indoor unit in a flat level by using the level indicator, unless it may cause leakage.



c. Dimension

Capacity (Btu/ h)	A	B	D	E
1800Btu/h	980	864	12.7	6.35
2400-30000Btu/h	1200	1084	16	9.53
30000-36000Btu/h	1200	1084	19	12.7
48000-60000Btu/h	1860	1744	19	12.7

Chart for wall mounting installation



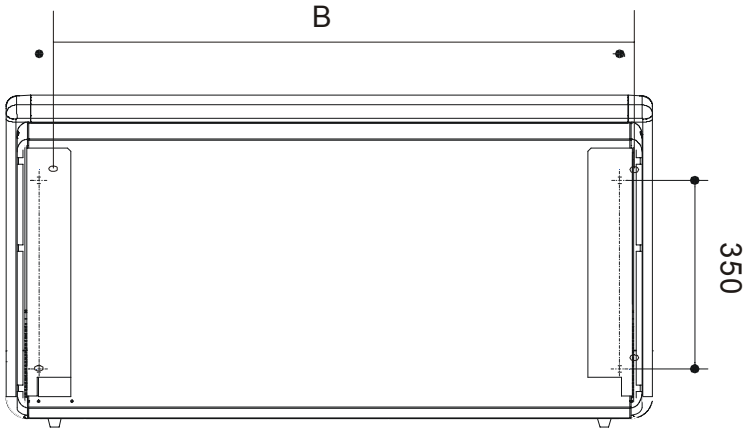
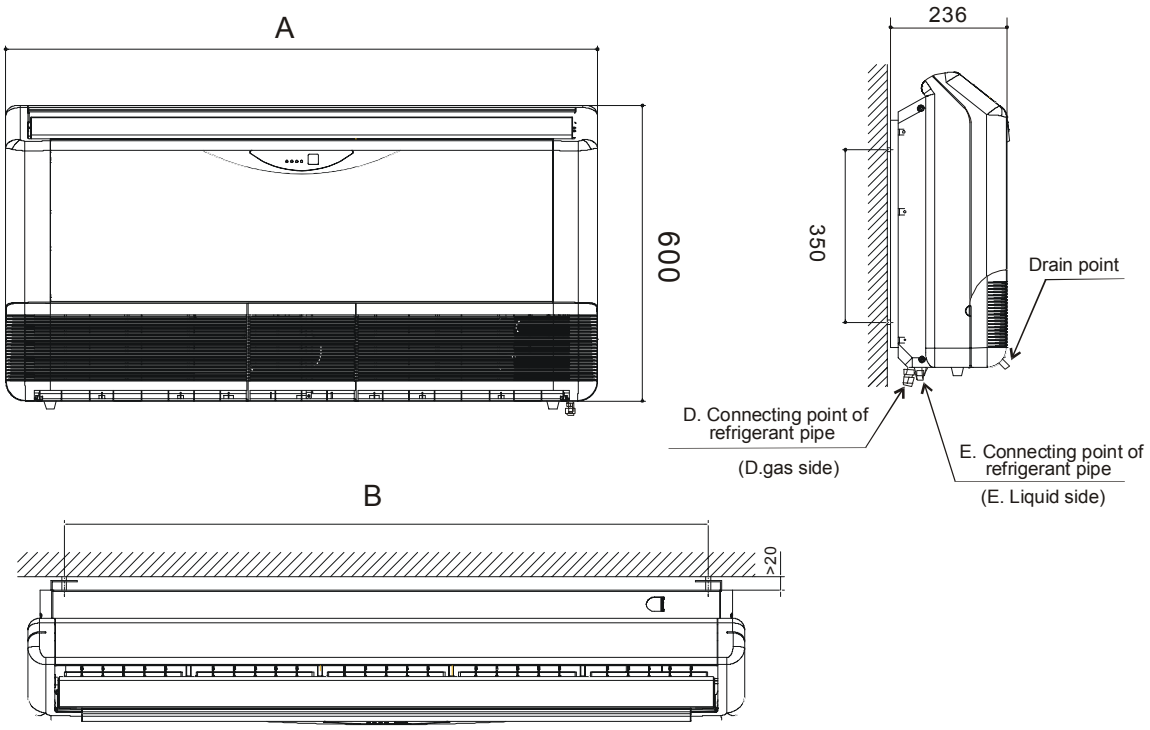


Chart for Ceiling Installation



2. Install outdoor unit

a. Caution

i. Keep this unit away from direct radiation of the sun or other heaters. If unavoidable, please cover it with a shelter.

ii. In places near coast or with a high attitude where the wind is strong, please install the outdoor unit against the wall to ensure normal performance.

iii. Use a baffle when necessary.

iv. In the case of extremely strong wind, please prevent the air from flowing backwards into the outdoor unit. (Refer to chart 10).

v. Locate the outdoor unit as close to the indoor unit as possible.

vi. The minimum distance between the outdoor unit and obstacles described in the installation chart does not mean that the same is applicable to the situation of an airtight. Leave open two of three directions A, B, and C.

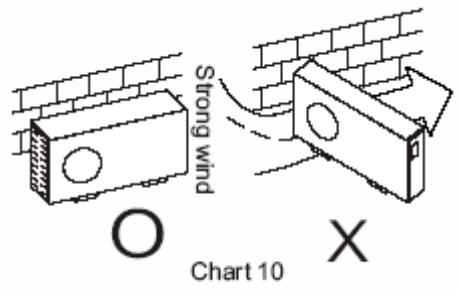


Chart 10

b. Necessary room for installation and maintenance (Refer to chart 11)

Remove the obstacles nearby to prevent the performance from being impeded by too little of air circulation. Leave open two of the three direction (A, B, and C).

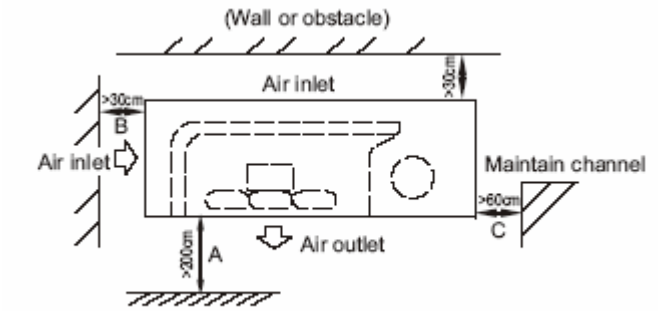


Chart 11

c. Moving and installing

i. Since the gravity center of this unit is not at its physical center, be careful when lifting it with a sling.
ii. Never hold the air-in of the outdoor unit to prevent it from deforming.
iii. Do not touch the fan with hands or other objects.
iv. Do not lean it more than 45° and do not lay it sidelong.
v. Fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind.
vi. Make concrete foundation. (Refer to chart 12).

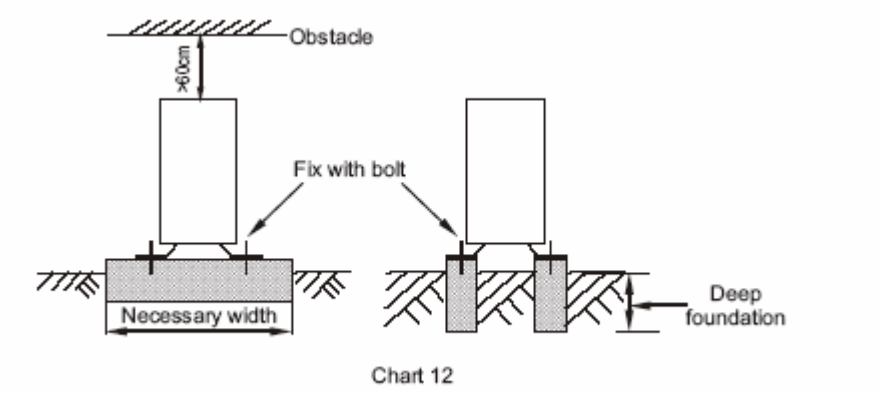


Chart 12

3. Refrigerant pipe connecting

Check whether the height drop between the indoor unit and outdoor unit. The length of refrigerant pipe and the number of the bends meet the following requirement:

- The max height drop …10m
  (If the height drop is more that 10m, the outdoor unit should put above the indoor unit).
- The length of refrigerant pipe …less than 30m
- The number of bends …less than 10m

a. Piping connection

i. Measure the necessary length of the connecting pipe, and make it by the following way.
- ❑ Connect the indoor unit at first, then the outdoor unit.
- ❑ Bend the tubing in proper way. Do not harm them.

CAUTIONS

- ❖ Daub the surfaces of the flare pipe and the joint nuts with frozen oil, and wrench it for 3~4 rounds with hands before fasten the flare nuts.
- ❖ Be sure to use two wrenches simultaneously when you connect or disconnect the pipes.

Tubing size	Torque
6.35	1420~1720N.cm(144~176kgf.cm)
9.52	3270~3990N.cm(333~407kgf.cm)
12.7	4950~6030N.cm(504~616kgf.cm)
16	6180~7540N.cm(630~770kgf.cm)
19	9720~11860N.cm(990~12106kgf.cm)

- ❖ The stop value of the outdoor unit should be closed absolutely (as original state). Every time you connect it, first loosen the nuts at the part of stop value, then connect the flare pipe immediately (in 5 minutes). If the nuts have been loosened for a long time, dusts and other impurities may enter the pipe system and may cause malfunction later. So please expel the air out of the pipe with refrigerant before connection.
- ❖ Expel the air after connecting the refrigerant pipe with the indoor unit and the outdoor unit. Then fasten the nuts at the repair-points.

ii. Locate The Pipe
- ❑ Drill a hole in the wall (suitable just for the size of the wall conduit), then set on the fittings such as the wall conduit and its cover.
- ❑ Bind the connecting pipe and the cables together tightly with binding tapes. Do not let air in, which will cause water leakage by condensation.
- ❑ Pass the bound connecting pipe through the wall conduit from outside. Be careful of the pipe allocation to do no damage to the tubing.

iii. Connect the pipes.

iv. Then, open the stem of stop values of the outdoor unit to make the refrigerant pipe connecting the indoor unit with the outdoor unit in fluent flow.

v. Be sure of no leakage by checking it with leak detector or soap water.

vi. Cover the joint of the connecting pipe to the indoor unit with the soundproof / insulating sheath (fittings), and bind it well with the tapes to prevent leakage.

b. Additional charge

When the length of the one-way pipe is less than 5m, additional refrigerant charge after vacuuming is not necessary.

When the length of one-way pipe is over 5m, the quantity to be added is as follows (unit in gram):

Connective pipe length	Air purging method	Additional amount of refrigerant to be charged
Less than 5m	Use refrigerant of outdoor unit	
Over 5m	Use vacuum pump or refrigerant cylinder	30g(length-5m) (capacity≤20000btu/h.) 65g(length-5m) (capacity≥24000btu/h.)

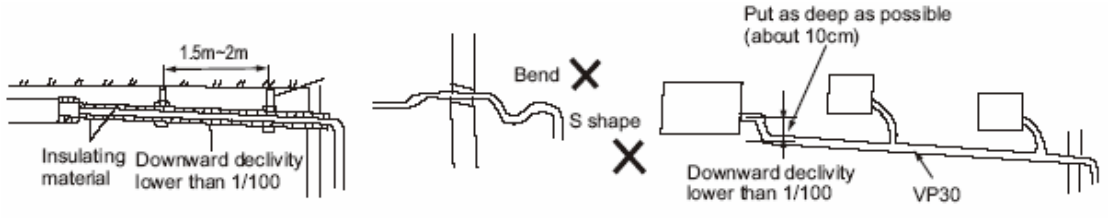
4. Connect the drain pipe

a. Install indoor unit drain pipe

The outlet has PTI screw bread. Use sealing materials and pipe sheath (fitting) when connecting PVC pipes.

Cautions

- The drain pipe of indoor unit must be heat insulated or it will condense dew, as well as the connections of the indoor unit.
- Hard PVC binder must be used for pipe connection and make sure there is no leakage.
- With the connection part to the indoor unit, be noted not to impose pressure on the side of indoor unit pipes.
- When the declivity of the drainpipe downwards is over 1/100, there should not be any winding.
- The total length of the drainpipe when pulled out traversal shall not exceed 20m, when the pipe is over long. A prop stand must be installed to prevent winding.
- Refer to the figures on the right for the installation of the pipes.



b. Drainage test

- Check whether the drainpipe is unhindered.
- New built house should have this test done before paving the ceiling.

c. Drain Elbow installation (Cooling only type without)

- Fit the seal into the drain elbow, then insert the drain elbow into the base pan hole of outdoor unit, rotate 90o to securely assemble them.
- Connect the drain elbow with an extension drain hose (Locally purchased). In case of the condensate draining off the outdoor unit during the heating mode.

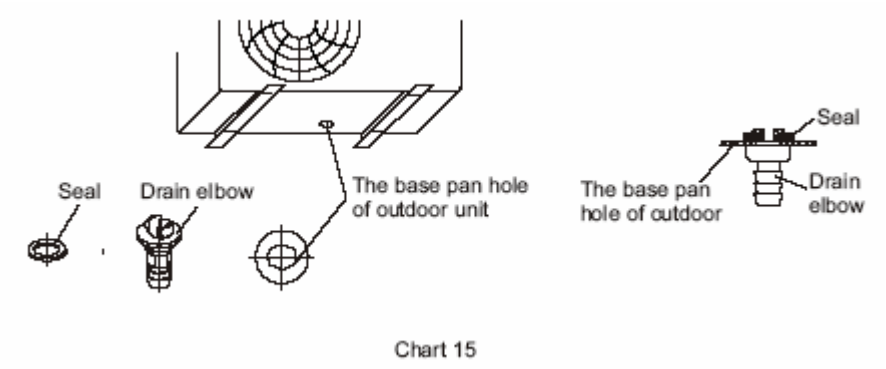


Chart 15

5. Wiring

a. Please refer to the Wiring Diagram.

i. The air conditioner should use separate power supply with rated voltage.

ii. The external power supply to the air conditioner should have ground wiring, which is linked to the ground wiring of the indoor and outdoor unit.

iii. The wiring work should be done by qualified persons according to circuit drawing.

iv. A leakage protector should be installed according to the National Standard concerning electrical appliance.

v. Be sure to locate the power wiring and the signal wiring well to avoid cross-disturbance and their contact with connecting pipe or stop value body.

vi. The wiring attached to this air conditional is 10m long. Be sure to prolong it with wiring of the same type and proper length if necessary. Generally, do not twist two wiring together unless the joint is soldered well and covered with insulator tape.

vii. Do not turn on the power until you have checked carefully after wiring.

b. The specification of power

TYPE		18000Btu/h (For R407C and R410A, Heating & cooling)	24000Btu/h (For R407C and R410A, Heating & cooling)	24000-36000Btu/h (For R407C and R410A, Heating & cooling)
POWER	PHASE	1-PHASE	1-PHASE	3-PHASE
	FREQUENCY AND VOLT	220-240V~, 50Hz	220-240V~, 50Hz	380V 3N~, 50Hz
CIRCUIT BREAKER /FUSE (A)		20/16	40/25	20/15
INDOOR UNIT POWER WIRING (mm^2)		-	3 x 2.5	5 x 1.5
INDOOR /OUTDOOR CONNECTING WIRING (mm^2)	GROUND WIRING	2.0	2.5	1.5
	OUTDOOR UNIT POWER WIRING	5 x 2.0	3 x 2.5	5 x 1.5
	STRONG ELECTRIC SIGNAL	5 x 2.0 (3 x 2.0)	3 x 1 (2 x 1)	4 x 1.0 (3 x 1.0)
	WEAK ELECTRIC SIGNAL	1-core shield wire 1 x 0.5mm^2	2-core shield wire 2 x 0.5mm^2	2-core shield wire 2 x 0.5

TYPE		30000-36000Btu/h (For R407C and R410A, Heating & cooling)	36000-60000Btu/h (For R407C and R410A, Heating & cooling)
POWER	PHASE	1-PHASE	3-PHASE
	FREQUENCY AND VOLT	220-240V~, 50Hz	380V-3N~, 50Hz
CIRCUIT BREAKER /FUSE (A)		40/35	40/20
INDOOR UNIT POWER WIRING (mm^2)		3 x 3.0	5 x 1.5
INDOOR /OUTDOOR CONNECTING WIRING (mm^2)	GROUND WIRING	3.0	1.5
	OUTDOOR UNIT POWER WIRING	3 x 3.0	5 x 1.5
	STRONG ELECTRIC SIGNAL	5 x 1 (3 x 1)	3 x 1 (2 x 1)
	WEAK ELECTRIC SIGNAL	1-core shield wire 1 x 0.5mm^2	-

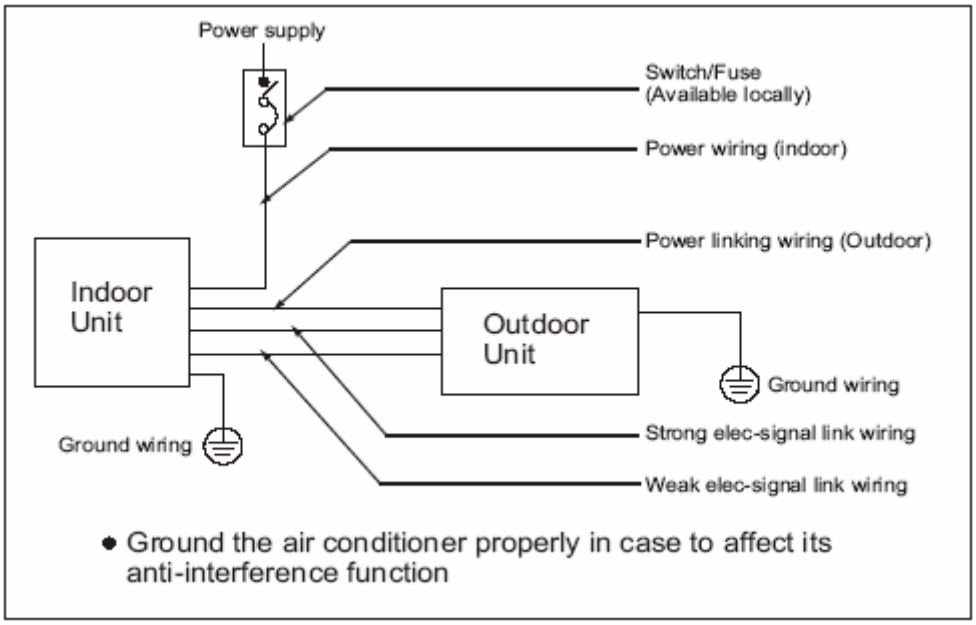
TYPE		18000Btu/h (For R407C and R410A, cooling only)	24000Btu/h (For R407C and R410A, cooling only)	24000-36000Btu/h (For R407C and R410A, cooling only)
POWER	PHASE	1-PHASE	1-PHASE	3-PHASE
	FREQUENCY AND VOLT	220-240V~, 50Hz	220-240V~, 50Hz	380V 3N~, 50Hz
CIRCUIT BREAKER /FUSE (A)		30/25	40/25	20/15
INDOOR UNIT POWER WIRING (mm^2)		3 x 2.0	3 x 2.5	5 x 1.5
INDOOR /OUTDOOR CONNECTING WIRING (mm^2)	GROUND WIRING	2.0	2.5	1.5
	OUTDOOR UNIT POWER WIRING	4 x 2.0	3 x 2.5	5 x 1.5
	STRONG ELECTRIC SIGNAL	-	2 x 1.0	3 x 1.0
	WEAK ELECTRIC SIGNAL	-	-	2-core shield wire 2 x 0.5

TYPE		30000-36000Btu/h (For R407C and R410A, cooling only)	36000-48000Btu/h (For R407C and R410A, cooling only)
POWER	PHASE	1-PHASE	3-PHASE
	FREQUENCY AND VOLT	220-240V~, 50Hz	380V-3N~, 50Hz
CIRCUIT BREAKER /FUSE (A)		40/25	25/15
INDOOR UNIT POWER WIRING (mm^2)		3 x 3.0	5 x 2.5
INDOOR /OUTDOOR CONNECTING WIRING (mm^2)	GROUND WIRING	3.5	2.5
	OUTDOOR UNIT POWER WIRING	3 x 3.0	5 x 2.5
	STRONG ELECTRIC SIGNAL	2 x 1.0	2 x 1.5
	WEAK ELECTRIC SIGNAL	-	-

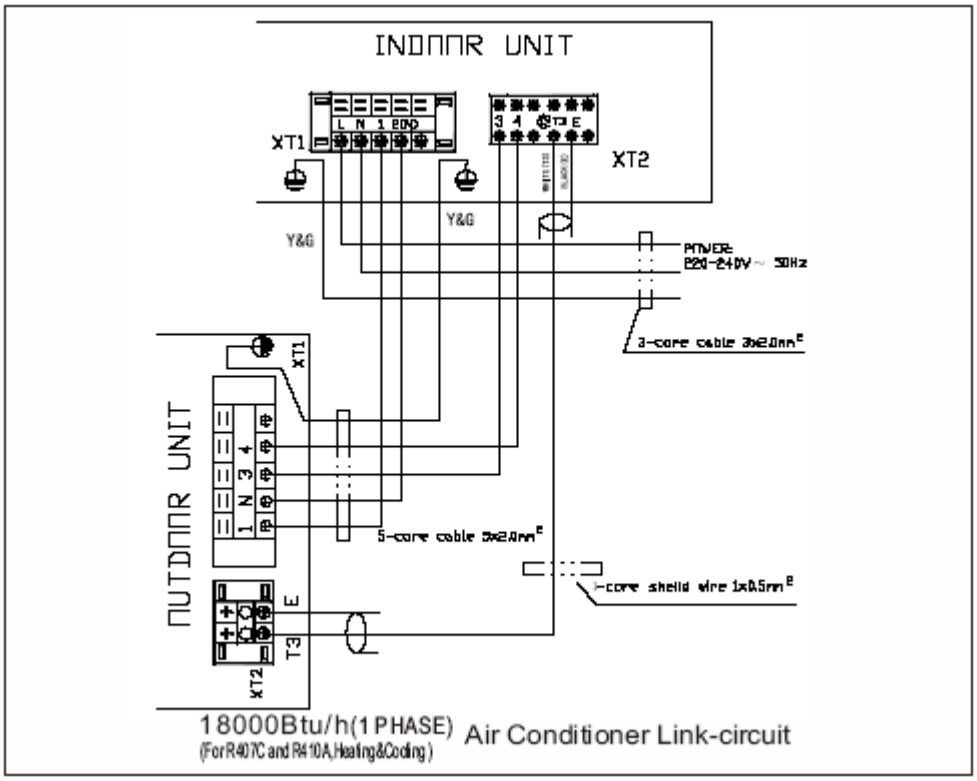
TYPE		36000-60000Btu/h (For R22C Heating & cooling)	36000-60000Btu/h (For R22C Heating & cooling)
POWER	PHASE	3-PHASE	3-PHASE
	FREQUENCY AND VOLT	380V 3N~, 50Hz	380V-3N~, 50Hz
CIRCUIT BREAKER /FUSE (A)		25/15	25/15
INDOOR UNIT POWER WIRING (mm^2)		5 x 2.5	5 x 2.5
INDOOR /OUTDOOR CONNECTING WIRING (mm^2)	GROUND WIRING	2.5	2.5
	OUTDOOR UNIT POWER WIRING	5 x 2.5	5 x 2.5
	STRONG ELECTRIC SIGNAL	3 x 1.5	1 x 1.5
	WEAK ELECTRIC SIGNAL	-	-

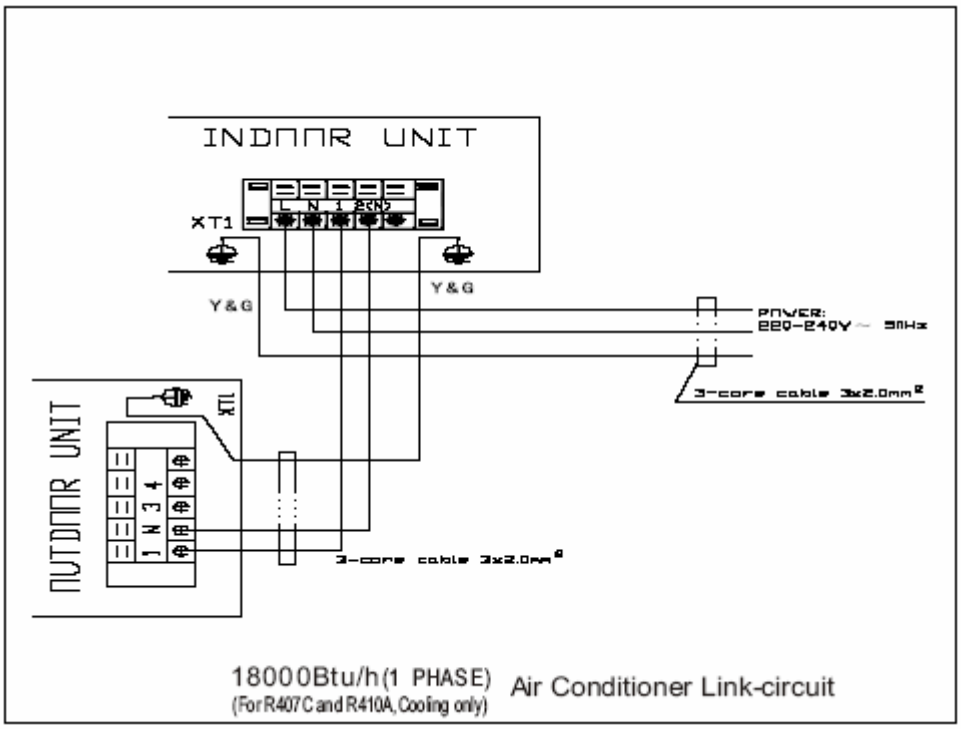
c. Wiring chart

Installing wiring hart, refer to link circuit chart for details.

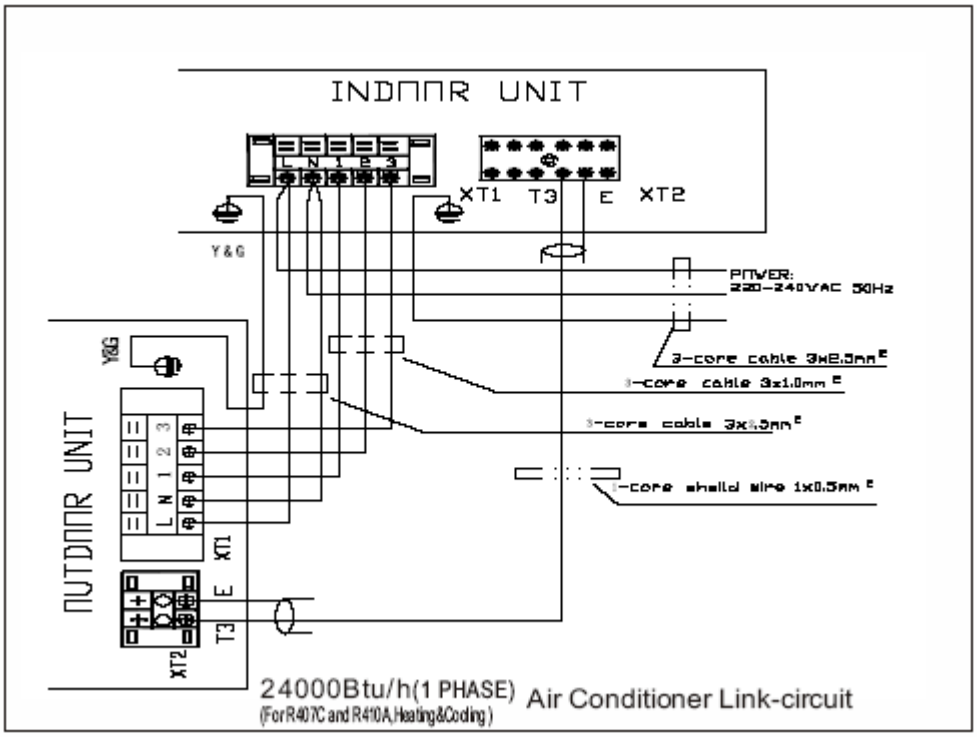


Caution: The wiring chart of both cooling only type and cooling & heating type in R22, R407C and R410A series are shown as follows. When wiring, please choose the corresponding chart or it may cause damage.

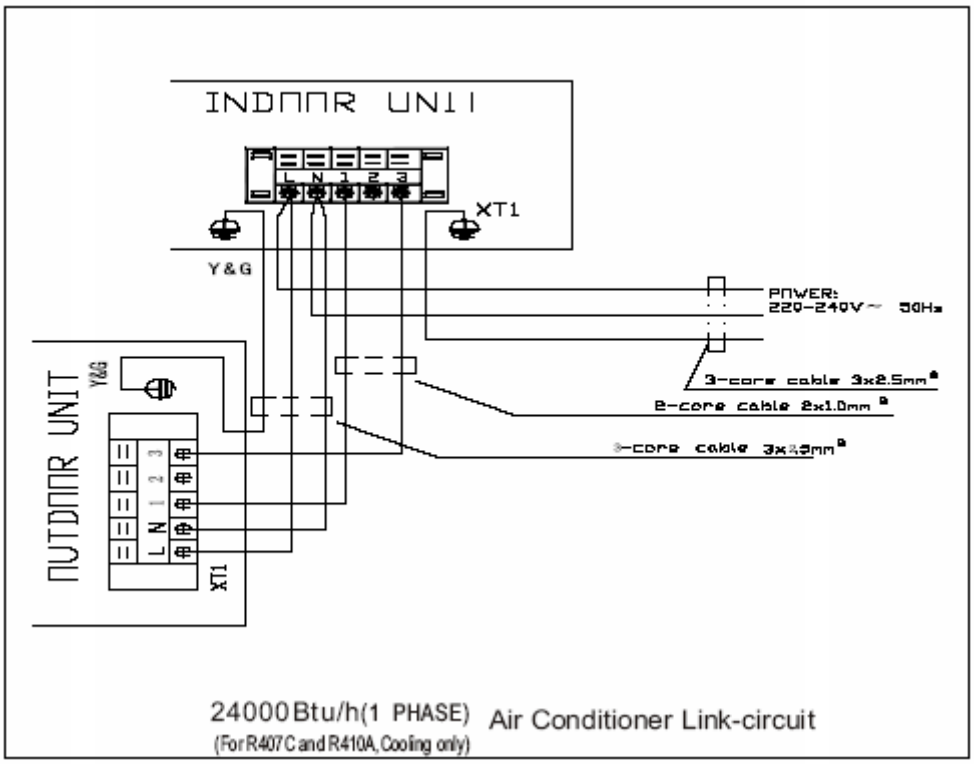




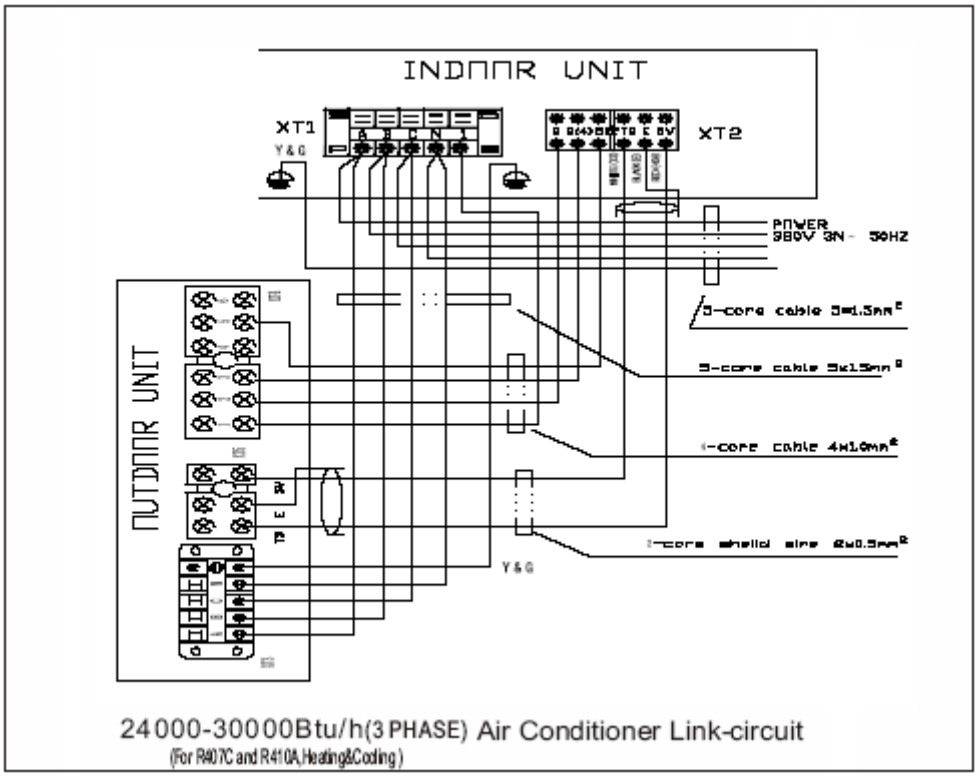
18000Btu/h(1 PHASE) Air Conditioner Link-circuit
(For R407C and R410A, Cooling only)



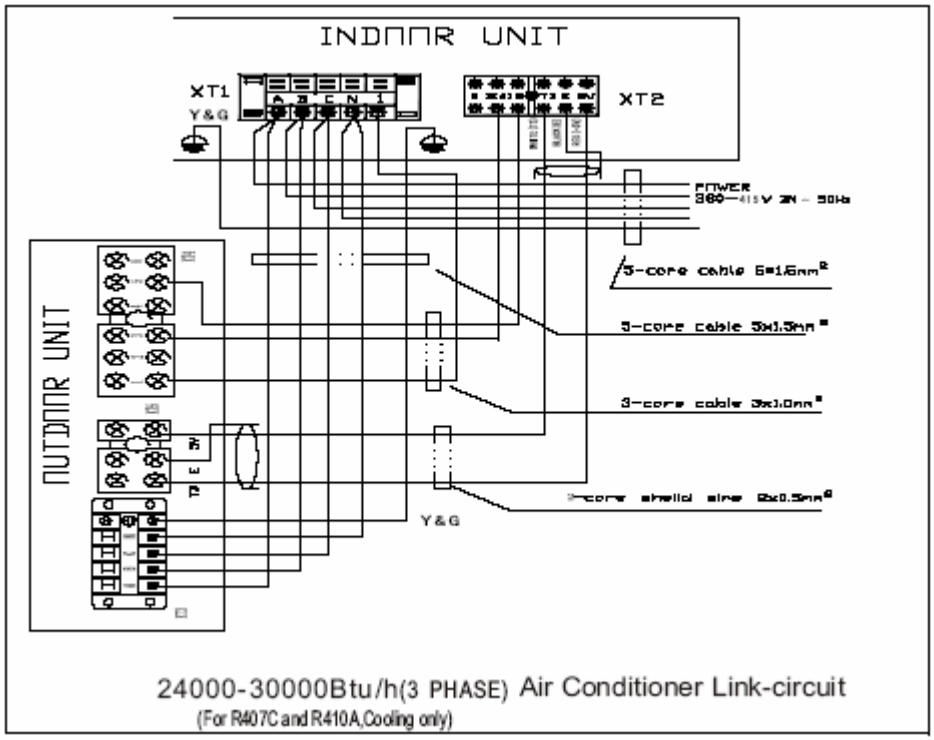
24000Btu/h(1 PHASE) Air Conditioner Link-circuit
(For R407C and R410A, Heating&Cooling)



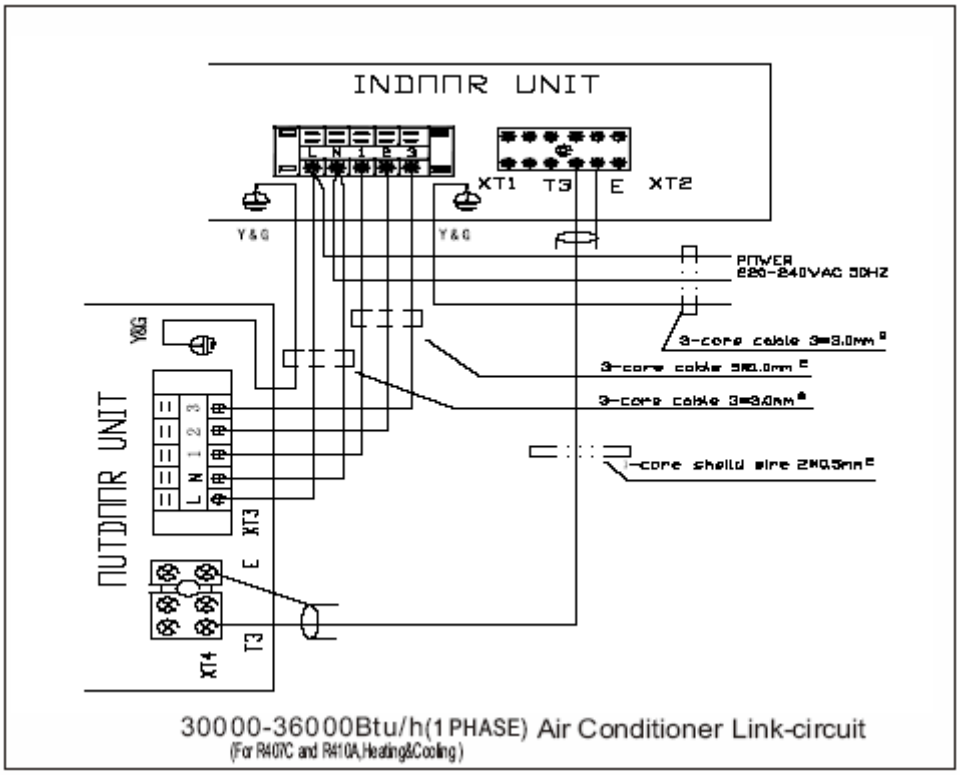
24000Btu/h(1 PHASE) Air Conditioner Link-circuit
(For R407C and R410A, Cooling only)



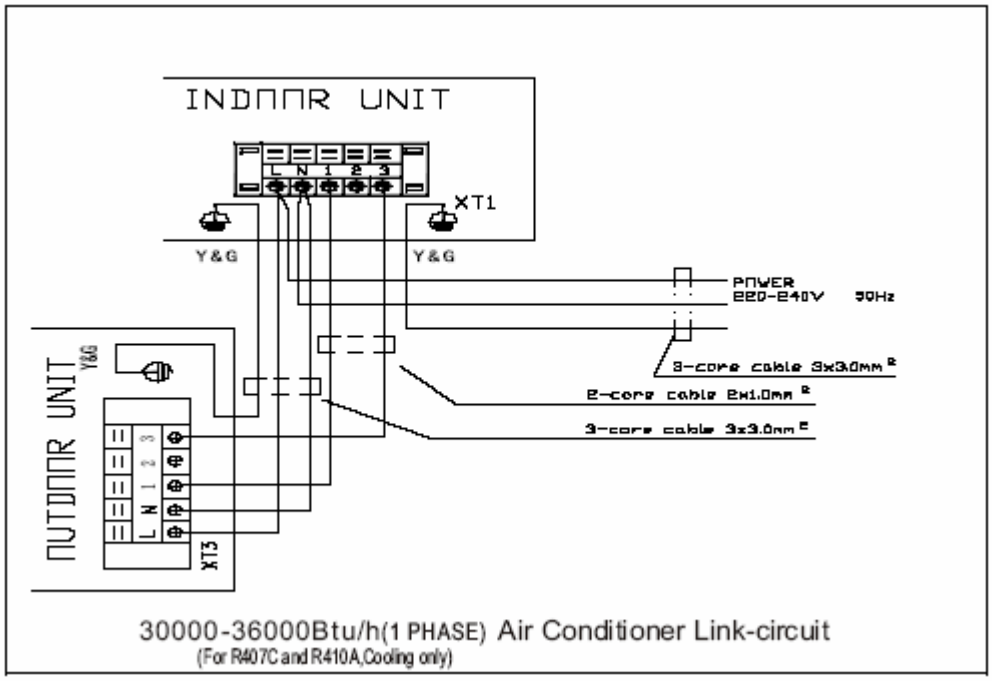
24000-30000Btu/h(3 PHASE) Air Conditioner Link-circuit
(For R407C and R410A, Heating&Cooling)



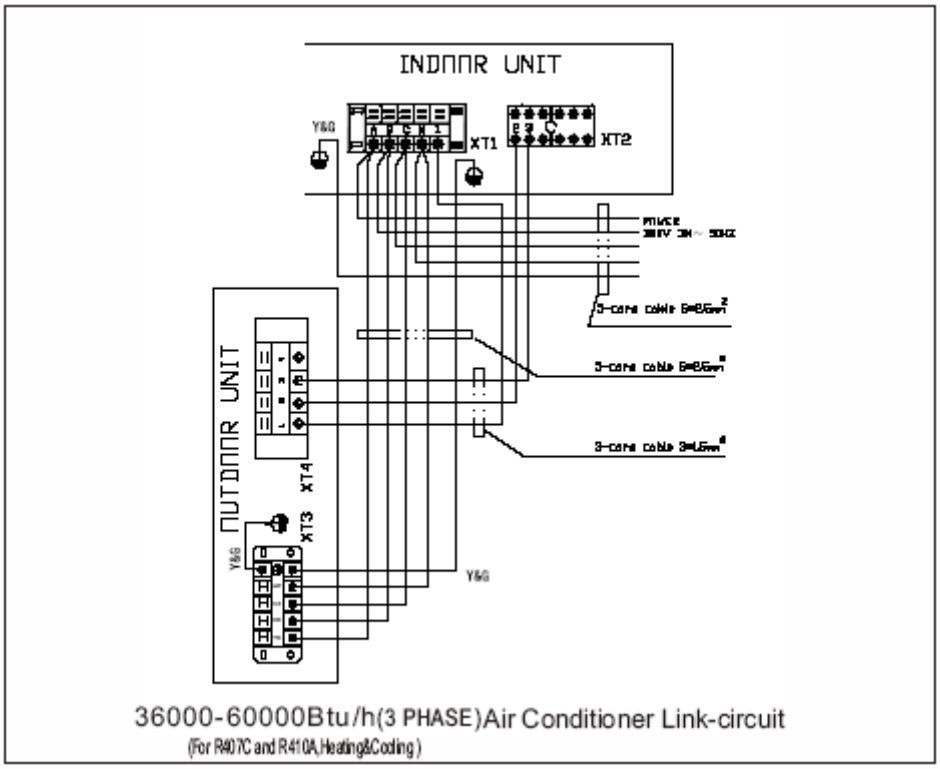
24000-30000Btu/h(3 PHASE) Air Conditioner Link-circuit
(For R407C and R410A,Cooling only)



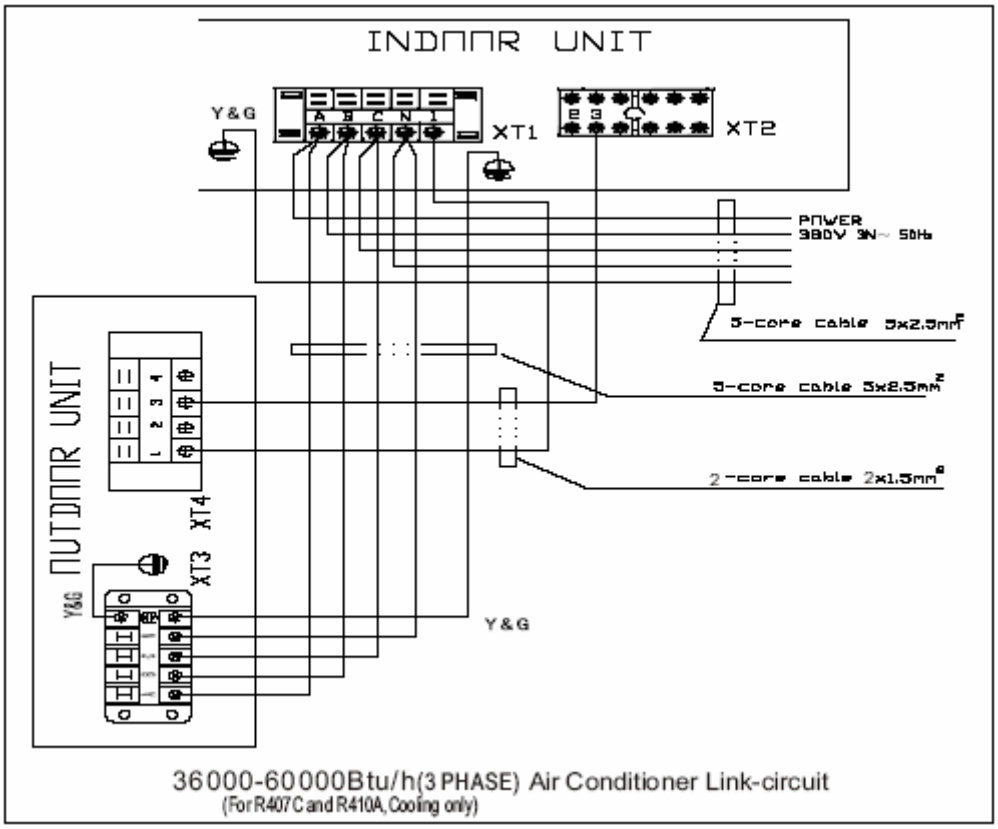
30000-36000Btu/h(1PHASE) Air Conditioner Link-circuit
(For R407C and R410A,Heating&Cooling)



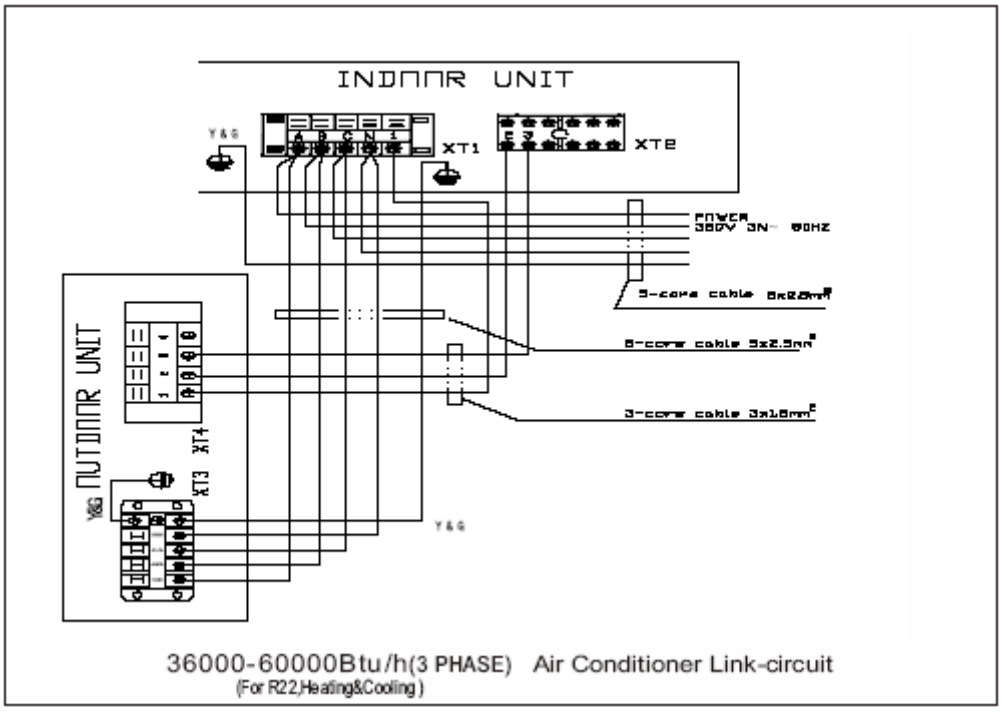
30000-36000Btu/h(1 PHASE) Air Conditioner Link-circuit
(For R407C and R410A,Cooling only)



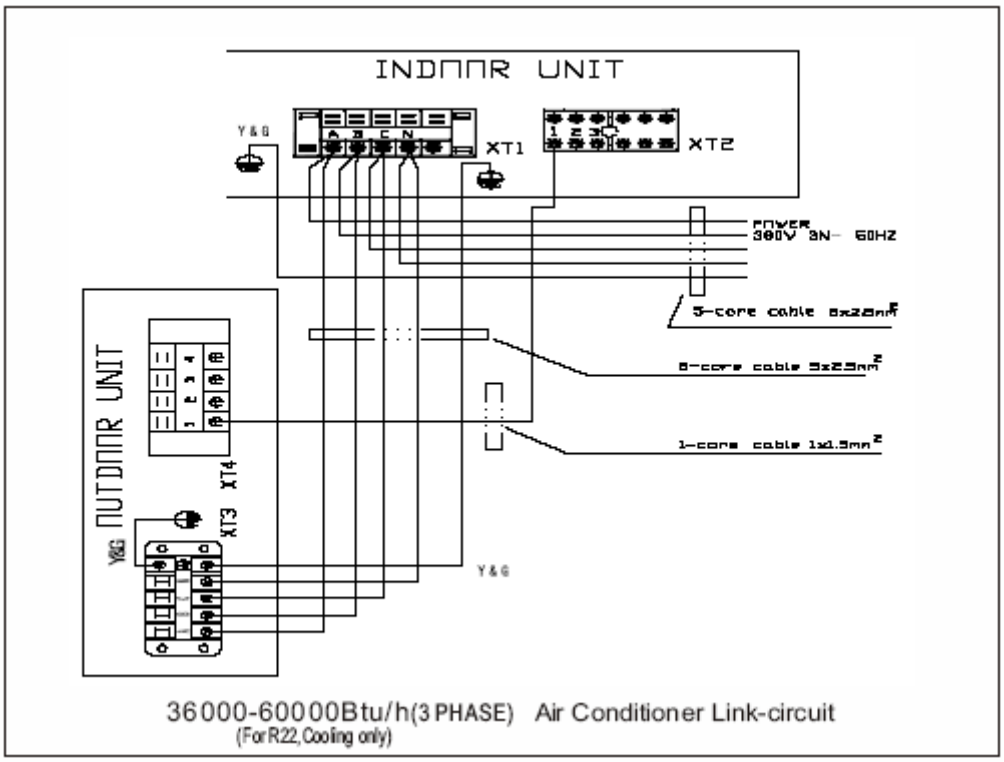
36000-60000Btu/h(3 PHASE)Air Conditioner Link-circuit
(For R407C and R410A,Heating&Cooling)



36000-60000Btu/h(3 PHASE) Air Conditioner Link-circuit
(For R407C and R410A, Cooling only)



36000-60000Btu/h(3 PHASE) Air Conditioner Link-circuit
(For R22,Heating&Cooling)



36000-60000Btu/h(3 PHASE) Air Conditioner Link-circuit
(For R22, Cooling only)

6. Test operation

a. The test operation must be carried out after the entire installation has been completed.

b. Please confirm the following points before the test operation.

- ❑ The indoor unit and outdoor unit are installed properly.
- ❑ Tubing and wiring are correctly completed.
- ❑ The refrigerant pipe system is leakage-checked.
- ❑ The drainage is unimpeded.
- ❑ The ground wiring is connected correctly.
- ❑ The length of the tubing and the added stow capacity of the refrigerant have been recorded.
- ❑ The power voltage fits the rated voltage of the air conditioner.
- ❑ There is no obstacle at the outlet and inlet of the outdoor and indoor units.
- ❑ The gas-side and liquid-side stop values are both opened.
- ❑ The air conditioner is pre-heated by turning on the power.

c. According to the user's requirement, install the remote controller when the remote controller's signal can reach the indoor unit smoothly.

d. Test operation

Indoor unit

- ❑ Whether the switch on the remote controller works well.
- ❑ Whether the buttons on the remote controller works well.
- ❑ Whether the air flow louver moves normally.
- ❑ Whether the room temperature is adjusted well.
- ❑ Whether the indicator lights normally.
- ❑ Whether the drainage is normal.
- ❑ Whether there is vibration or abnormal noise during operation.

Outdoor unit

- ❑ Whether there is vibration or abnormal noise during operation.
- ❑ Whether the generated wind, noise, or condensed of by the air conditioner have influenced your neighborhood.
- ❑ Whether any of the refrigerants is leaked.

SERVICING AND MAINTENANCE

1. Troubles and Solutions

If any the following abnormal conditions occur, turn off the power supply immediately. Please contact our dealer.	
TROUBLES	Indicator lamps flash rapidly, after your disconnecting and connecting the unit, the situation is the same.
	Fuse or circuit breaker work frequently.
	Foreign matter or water has fallen into the unit.
	Remote controller is disabled or the switch is out of hand.
	Any other unusual conditioner is observed.

If any of the following conditions occur, check your unit and resolve corresponding problems referring to given remediation. If the trouble can't be settled contact our dealer.		
Trouble	Cause	Solutions
Unit does not start	Power failure.	Wait for the comeback of power
	Power switch is open.	Switch on the power
	Fuse of power switch may have blown.	Replace the fuse
	Batteries of remote controller are exhausted.	Replace the batteries
	The time is not start-up time you have set.	Wait or cancel the time set.
Air flowing normally with low cooling(heating) effect	Temperature is not set correctly.	Set the temperature properly.
	Door or window is open.	Close door and window.
	Air filter is blocked with dust or dirtiness.	Clean the air filter.
	Inlet/outlet of indoor/outdoor units are blocked.	Clear all blockages.
	Inlet/outlet of indoor/outdoor units are blocked.	Clear the blockage, then restart your operation.
	Be in 3 minutes protection of compressor	Wait

NOTE: Do not replace electric wire or repair the air conditioner by yourself to avoid possible danger.

2. Troubles and solutions concerning the remote controller

Please make the following check before asking for repair or maintenance.

Trouble	Cause	Solutions
CAN NOT CHANGE THE FAN SPEED SETTING	Check if the mode display on the LCD is AUTO	The indoor Unit will select fan speed automatically when AUTO mode is selected.
	Check if the mode display on the LCD is DRY	The indoor Unit will select fan speed automatically when the unit is on DRY mode.

The transmission symbol does not flash		
Symptom	Checking items	Cause
Press ON/OFF button, the remote controlling signals can not be transmitted	Check if the remote controller has run out of power	When the battery was out, transmission signals can not be sent

Temperature display disappear		
Symptom	Checking items	Cause
Temperature Display does not light.	Check if the mode display on the LCD is FAN ONLY	You can not set the temperature when the unit is on FAN ONLY mode.

The Display Goes Off		
Symptom	Checking items	Cause
The indication on the display disappears after a lapse of time.	Check whether the timer operation has come to an end when the OFF TIMER is indicated on the display.	The air conditioner operation stops since the set time elapsed.
The ON TIMER indicators go off after a lapse of certain time.	Check whether the timer operation is started when the ON TIMER is indicated on the display.	When the time set to start the air conditioner is reached, the air conditioner will automatically start and the appropriate indicator will go off.

The Signal Receiving Tone does Not Sound		
Symptom	Checking items	Cause
No receiving tone sounds from the indoor unit even when the ON/OFF button is pushed.	Check whether the signal transmitter of the remote controller is properly directed to the receiver of the indoor unit when the ON/OFF button is pushed.	Direct the signal transmitter of the remote controller to the receiver of the indoor unit, and then repeatly push the ON/OFF button twice.
Buttons on the remote controller don't work.		Press Reset button.

3. Clean

CAUTION:
Please turn off your air conditioner and disconnect power supply before cleaning.

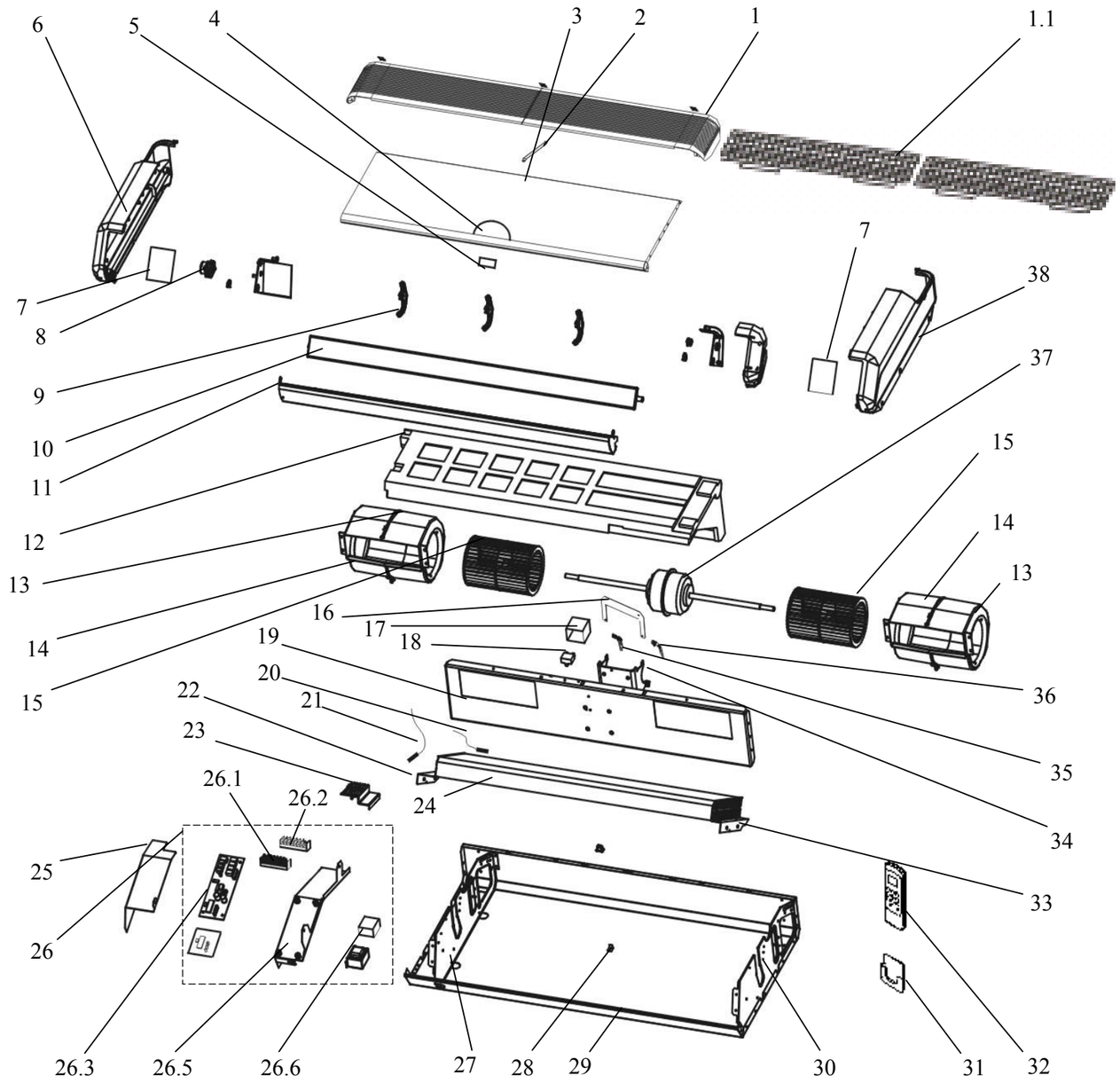
a. CLEANING INDOOR UNIT
- Use a dry to wipe the indoor unit.
- A cloth dampened with cold water may be used if the indoor unit is too dirty.
- It is allowed to remove the front panel of indoor unit and clean it with water, and ensure to wipe it up with a dry rag.

Note:
Do not use a chemically treated duster for wiping or leave such materials near the unit for long.
Do not use benzene, thinner, polishing powder, or similar solvents for cleaning.

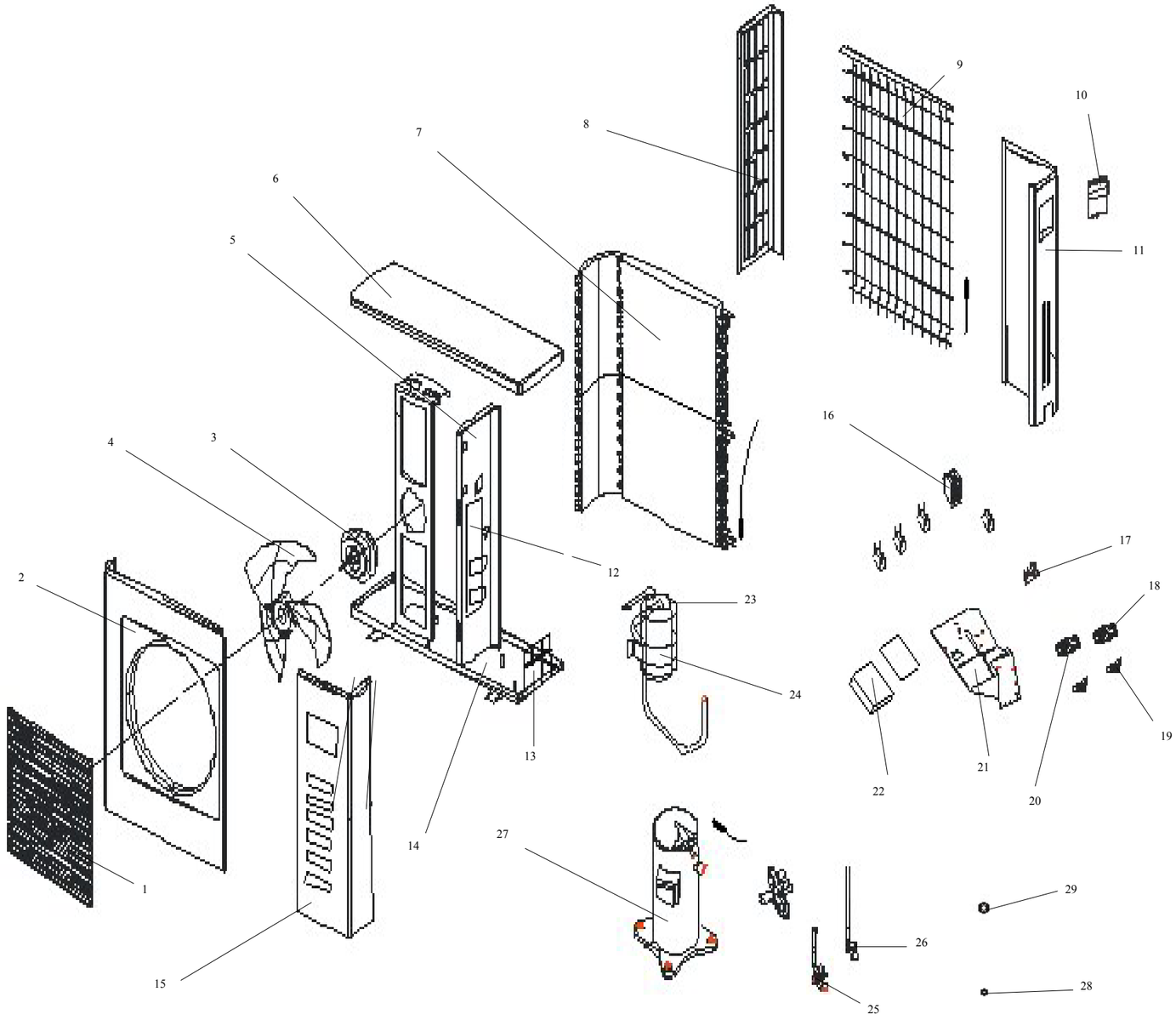
b. CLEANING AIR FILTER
- The air filter in unit can filter dust and other granules in air. It may reduce the cooling effect that the air filter is covered with dust. So clean the air filter often.

EXPLODED VIEW

Indoor Unit



Outdoor Unit



PART LIST

Indoor Unit

No	Part name	Qty
1	Front grille assy	1
1.1	Air filter	2
2	Clap for grille	1
3	Front panel assy	1
4	Display panel	1
5	Display board	1
6	Left cover	1
7	Side cover for air-out frame	2
8	Louver motor	1
9	Supporter for horizontal louver	3
10	Louver assy	1
11	Air-out frame assy	1
12	Water collector assy	1
13	Left volute shell	2
14	Right volute shell	2
15	Centrifugal fan	2
16	Strengthen board for motor	1
17	Capacitor box	1
18	Fan capacitor	1
19	Middle beam	1
20	Evaporator temp sensor	1
21	Evaporator temp sensor	1
22	Right fixing board for evaporator	1
23	Protecting board	1
24	Evaporator	1
25	E-parts box cover	1
26	Electric control assy	1
26.1	Terminal block, 5p	1
26.2	Wire joint	1
26.3	Main control board	1
26.5	Electric part box	1
26.6	Transformer	1
27	Left separating board	1
28	Fixing board for middle beam	1
29	Chassis	1
30	Right separating board	1
31	Holder for remote controller	1
32	Remote controller	1
33	Left fixing board for evaporator	1
34	Holder for fan motor	1
35	Right fixing clamp for motor	1
36	Left fixing clamp for motor	1
37	Fan motor	1
38	Right cover	1

Outdoor Unit

No	Part name	Qty
1	Front net	1
	Clamp for front net	10
2	Front clap board	1
3	Propeller fan	1
4	Fan motor	1
5	Holder for fan motor	1
6	Top cover	1
7	Condenser I	1
	Condenser II	1
8	Left clap board	1
9	Rear net	1
10	Big handle	1
11	Rear right clap board	1
12	Separating board	1
13	Installation plate for valves	1
14	Chassis	1
15	Front right clap board	1
16	AC contactor	1
17	Fan motor capacitor	1
18	Connector	1
19	Washer for wire joint	1
20	Wire joint, 5p	1
21	Installation board for E-parts	1
22	Clamp for wiring	1
23	Refrigerant container	1
24	Fixing clamp, container	1
25	Liquid pipe valve	1
26	Gas pipe valve assy	1
27	Compressor	1
28	Copper nut, TLM-C03	1
29	Copper nut, TLM-E05	1

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