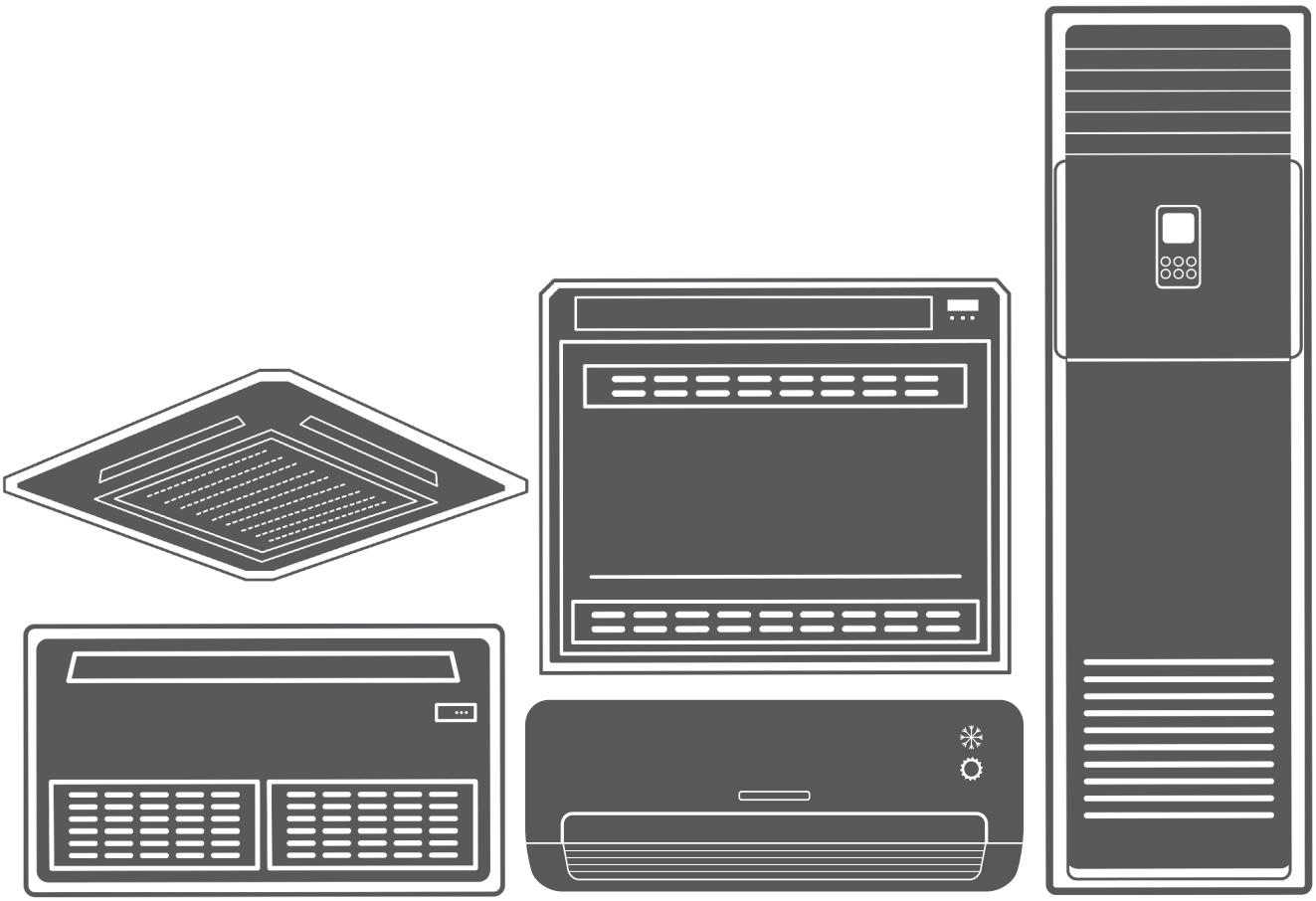
AIR CONDITIONING SYSTEMS

LCAC

• SERVICE MANUAL



ENGLISH

※The specifications, designs, and information in this book are subject to change without notice for product improvement.

Part 1
General Information

1. Model Lists

1.1 Indoor Units

R410A (capacity multiplied by 1000Btu/h)

Type	Function	12	16	18	24	30	36	42	48	55
Console		●	●							

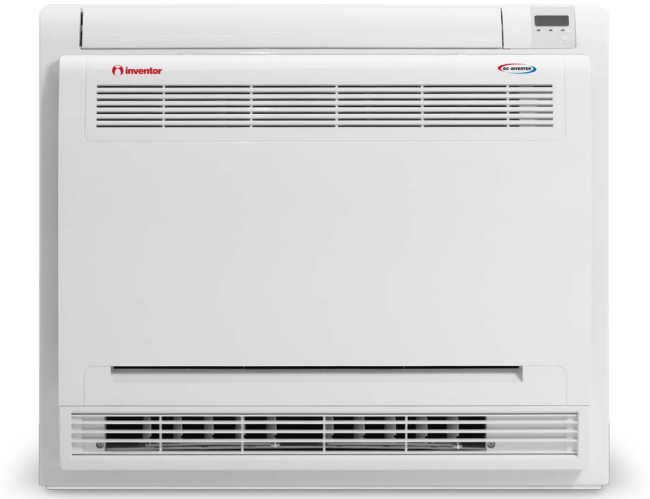
1.2 Outdoor Units

Universal Outdoor unit Model	Compressor type	Compressor Brand	Matched indoor units
V5MLO32-12	Rotary	GMCC	V5MLI32-12

2. External Appearance

2.1 Indoor Units

Console



2.2 Outdoor Units

Single fan outdoor unit

Console Type

1. Features

1.1. Modern and elegant appearance

- The simple and stylish designs can nicely harmonies with your living space.

1.2. Four panels optional

1.3. Two air-outlet ways

Cooling mode

Quick Cooling

To maintain room temp

- Air outlet from top and bottom to make quick cooling ------When the A/C is just switched on, or room temperature is still high, cold air will be blown out from top and bottom air outlet to cool down the room quickly
- Air outlet from top to maintain room temperature ----When the room has been cooled down, or the A/C has been opened over 1 hour, cold air only from the top outlet to keep constant room temp

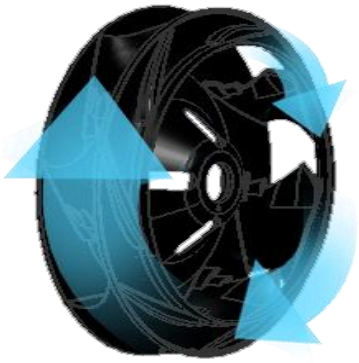
Heating mode

- Anti-cold air ------When the AC is just turn on, temperature of evaporator is very low, in this case, in order to prevent cold air direct blowing, only the upper louver is opened in a high position, the lower louver closed.

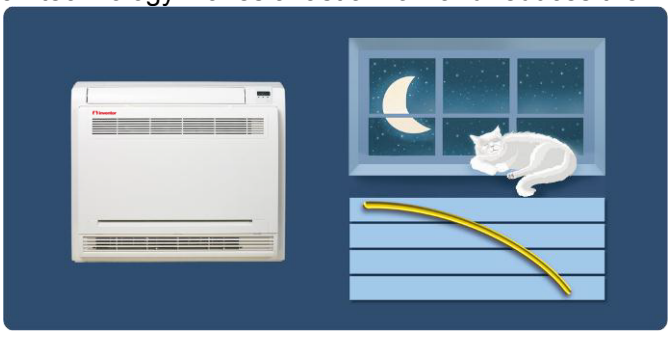
1.4. Four air inlets

1.5. Low noise

- DC indoor fan motor, which has five speeds.
- Low noise and energy saving.



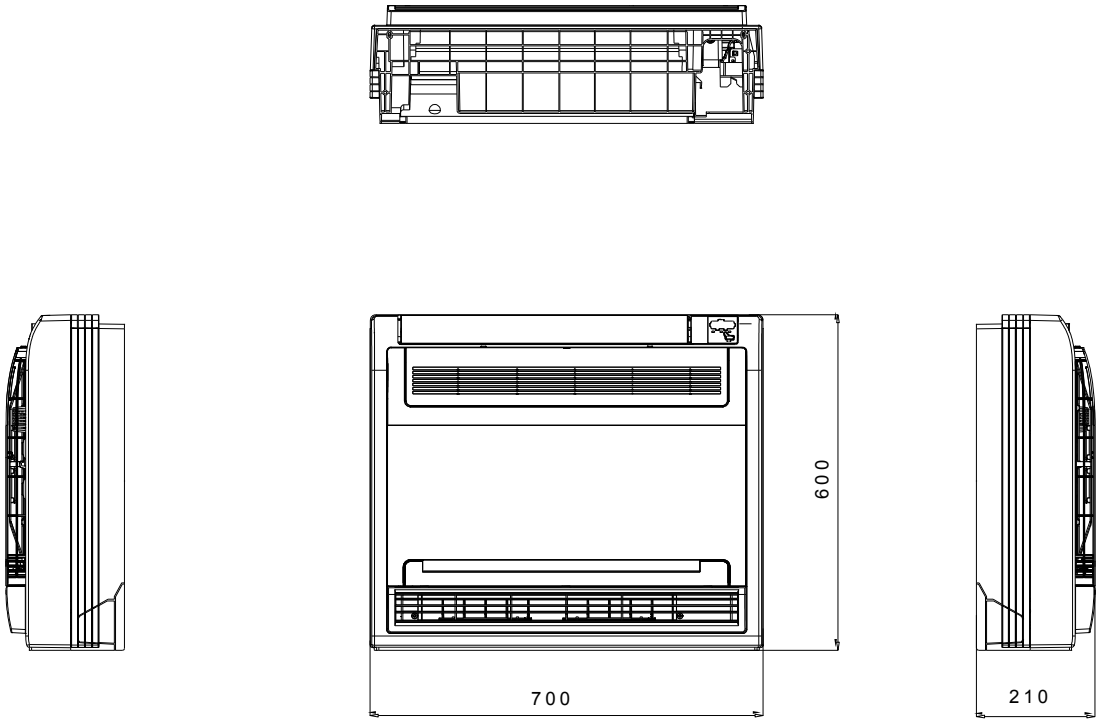
- Advanced centrifugal fan technology makes a fast airflow and reduces the indoor noise.

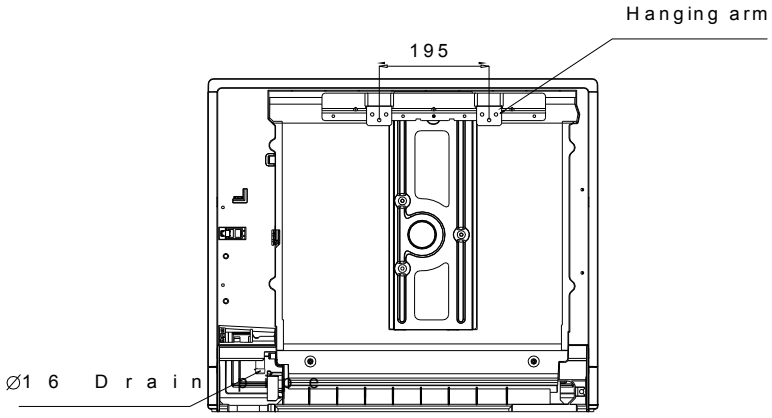


1.6. Golden fin is optional.

1.7. Active carbon filter is standard.

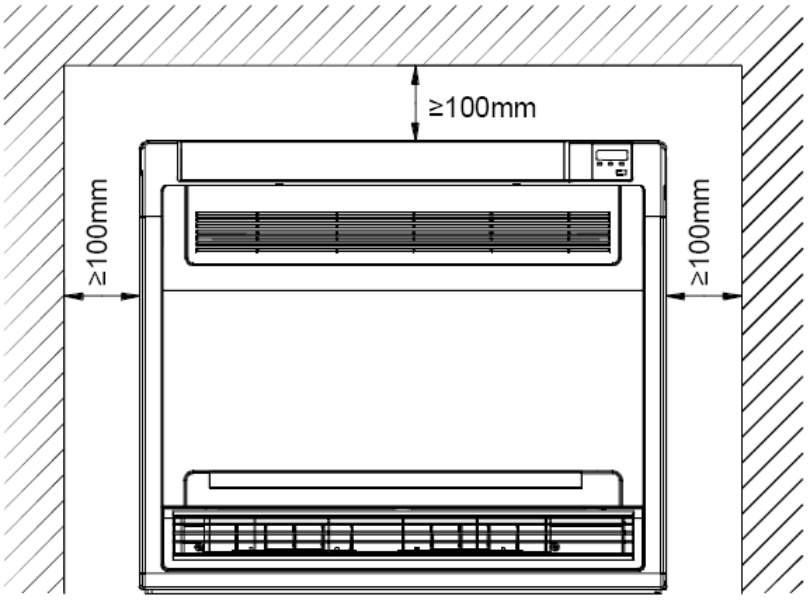
2. Dimensions

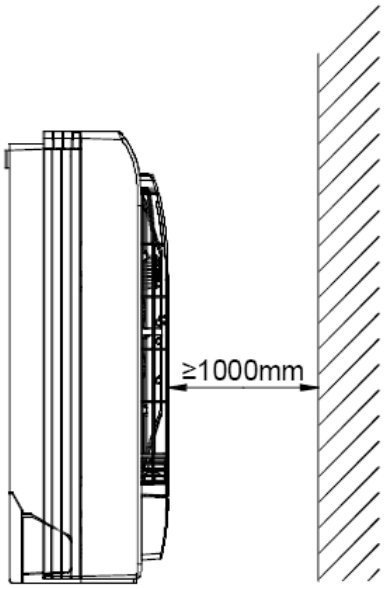




Unit: mm

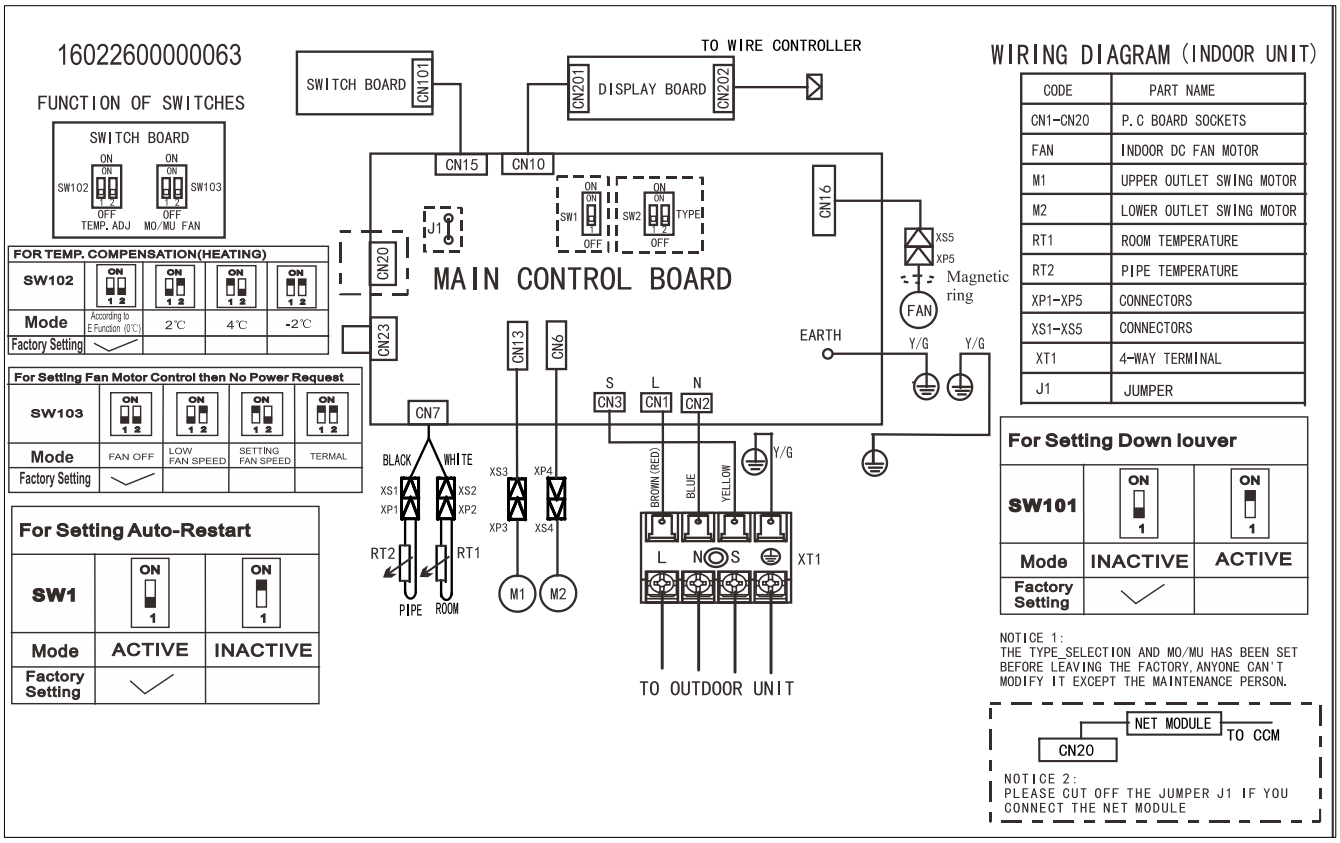
3. Service Space



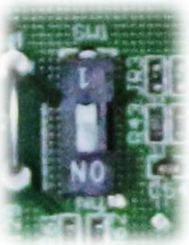


4. Wiring Diagrams

V5MLI32-12



4.1 Micro-Switch Introduce:



For Setting Auto-Restart		
SW1	ON 1	ON 1
Mode	ACTIVE	INACTIVE
Factory Setting	✓	

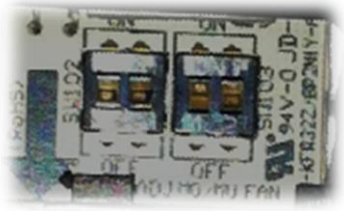
A. Micro-switch SW1 is for selection of auto-restart function.
Range: Active, inactive

For Setting Down louver		
SW101	ON 1	ON 1
Mode	INACTIVE	ACTIVE
Factory Setting	✓	

B. Take off the panel, you can see the switch SW101 which is used for selecting both air outlets or upper air outlet only.

FOR TEMP. COMPENSATION(HEATING)				
SW102	ON 1 2	ON 1 2	ON 1 2	ON 1 2
Mode	According to E Function (0℃)	2℃	4℃	-2℃
Factory Setting	✓			

C.Micro-switch SW102 is for selection of temperature compensation in heating mode. This helps to reduce the real temperature difference between ceiling and floor so that the unit could run properly. If the unit is on-floor installed, 0 should be chosen.
Range: E function (reserved for special customizing) /0^{o}C, 2^{o}C, 4^{o}C, -2^{o}C

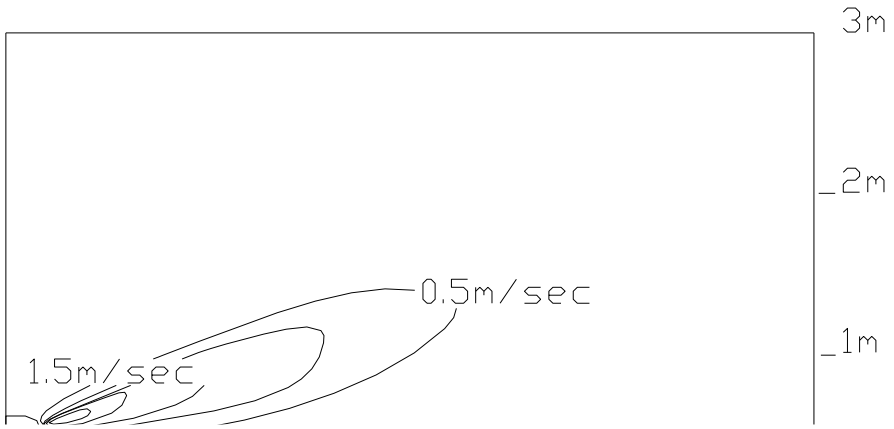


For Setting Fan Motor Control then No Power Request				
SW103	ON 1 2	ON 1 2	ON 1 2	ON 1 2
Mode	FAN OFF	LOW FAN SPEED	SETTING FAN SPEED	TERMAL
Factory Setting	✓			

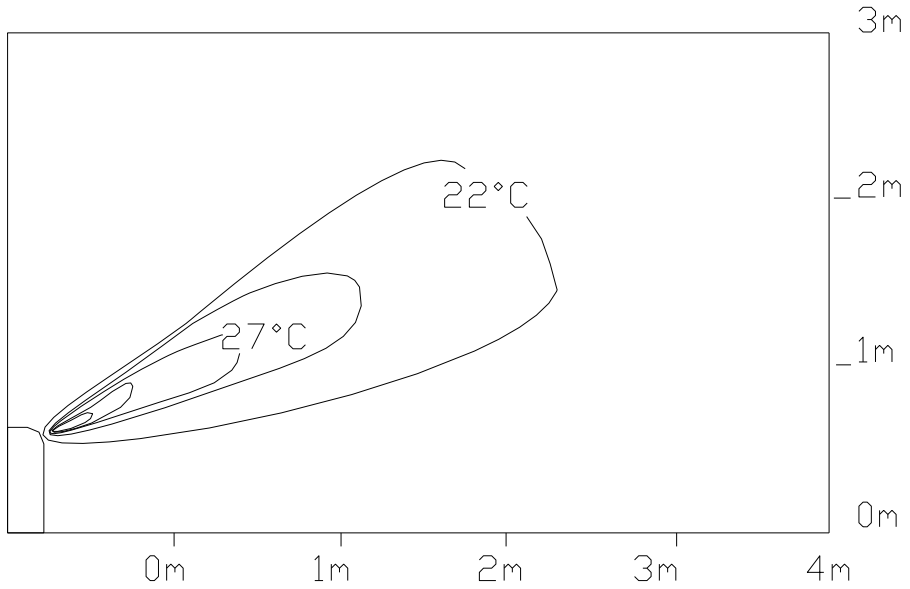
D. Micro-switch SW103 is for selection of indoor FAN ACTION if room temperature reaches the setponit and the compressor stops.
Range: OFF (in 127s), Low Speed, Setting Speed, Termal (runs for 1 minute ever 4-minute stop).

5. Air Velocity and Temperature Distributions (Reference Data)

Airflow velocity



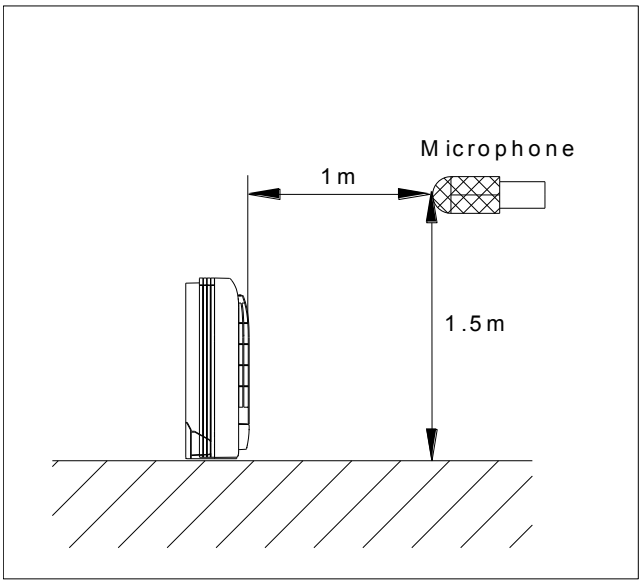
Temperature



6. Electric Characteristics

Model	Indoor Units				Power Supply
	Hz	Voltage	Min.	Max.	MFA
V5MLI32-12	50	220-240V	198V	254V	/

7. Sound Levels



Model	Noise Power dB(A)	Noise level dB(A)		
		H	M	L
V5MLI32-12	58	47	41	35

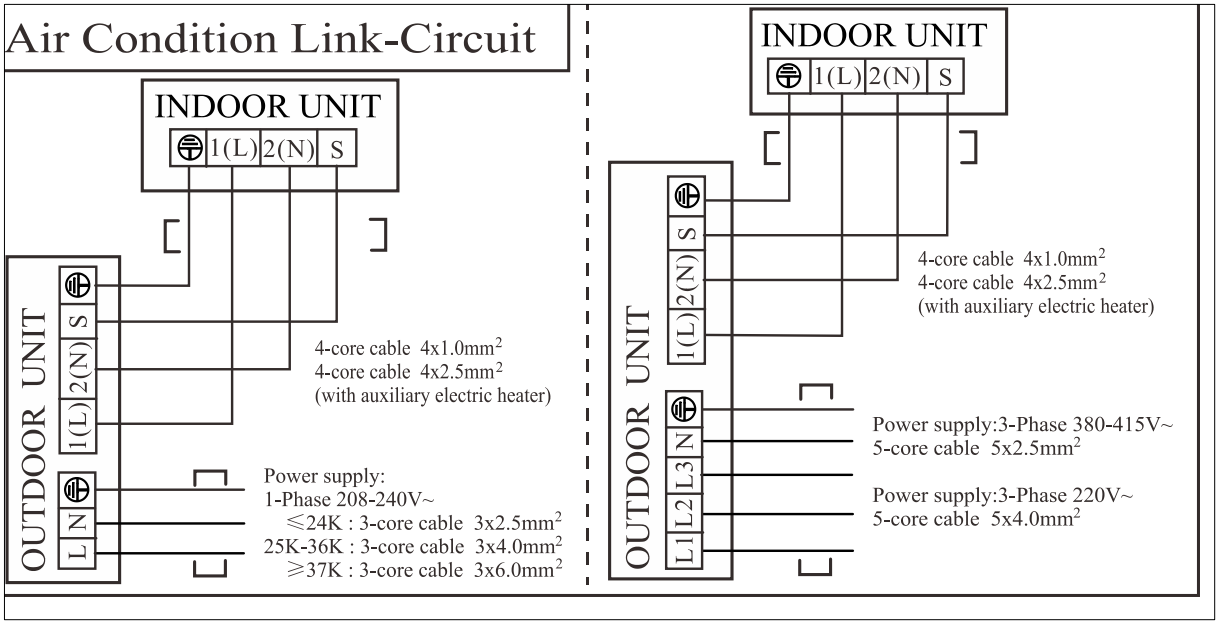
8. Accessories

	Name	Shape	Quantity
Installation fittings	Hook		2
Remote controller & Its Frame	Remote controller		1
	Frame		1
	Mounting screw(ST2.9×10-C-H)		2
	Alkaline dry batteries (AM4)		2
Others	Installation manual	/	1
	Owner's manual	/	1

9. The Specification of Power

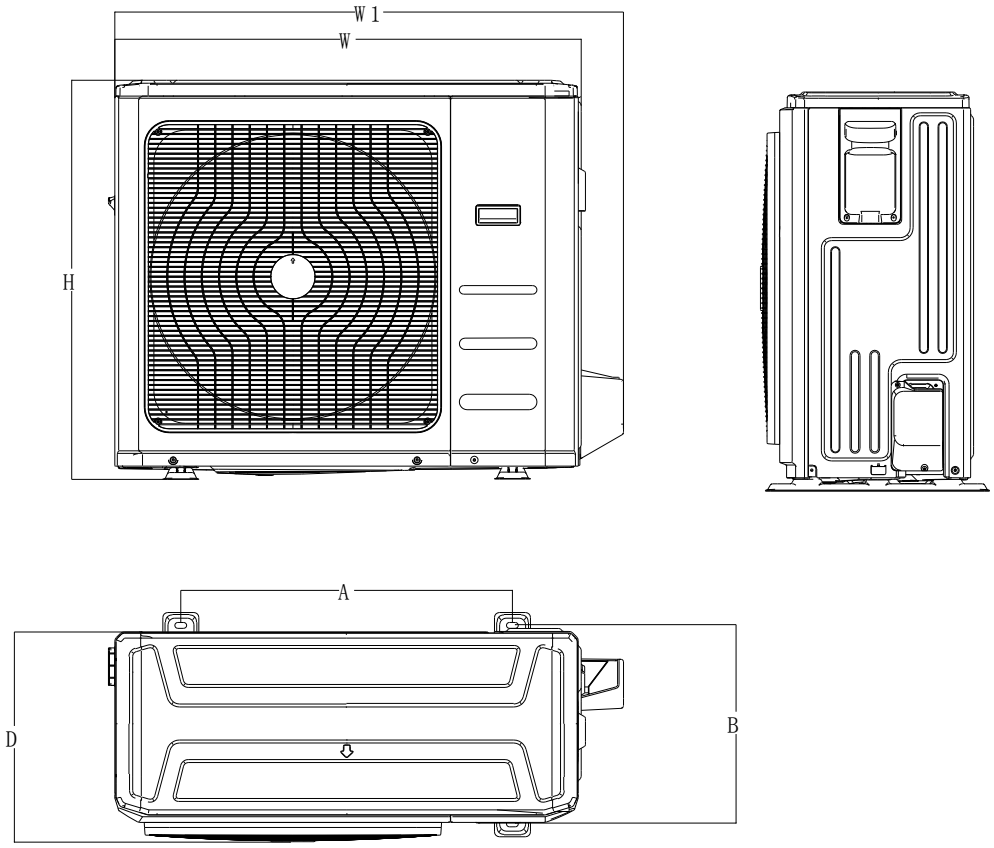
Model(Btu/h)		12000	16000
POWER	Phase	1-phase	1-phase
	Frequency and Voltage	220-240V, 50Hz	220-240V, 50Hz
	POWER WIRING (mm^2)	3×2.5	3×2.5
CIRCUIT BREAKER/Fuse (A)		20/16	30/20
Indoor/Outdoor Connecting Wiring(Weak Electric Signal) (mm^2)		———	———
Indoor/Outdoor Connecting Wiring(Strong Electric Signal)(mm^2)		4×1.0(4x2.5 with auxiliary electric heater)	4×1.0(4x2.5 with auxiliary electric heater)

10. Field Wiring



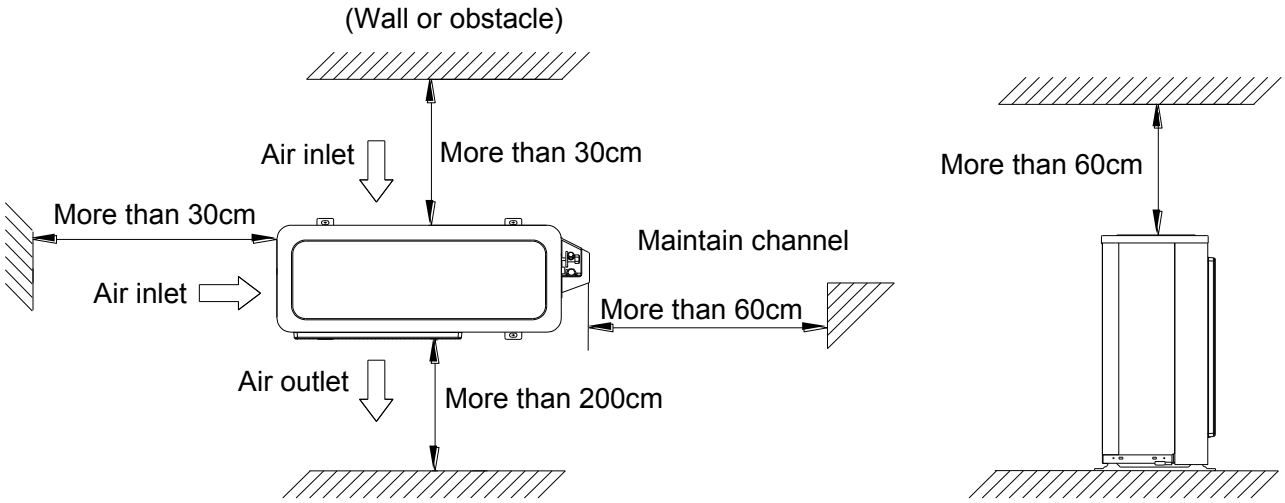
Part 3
Outdoor Units

1. Dimensions



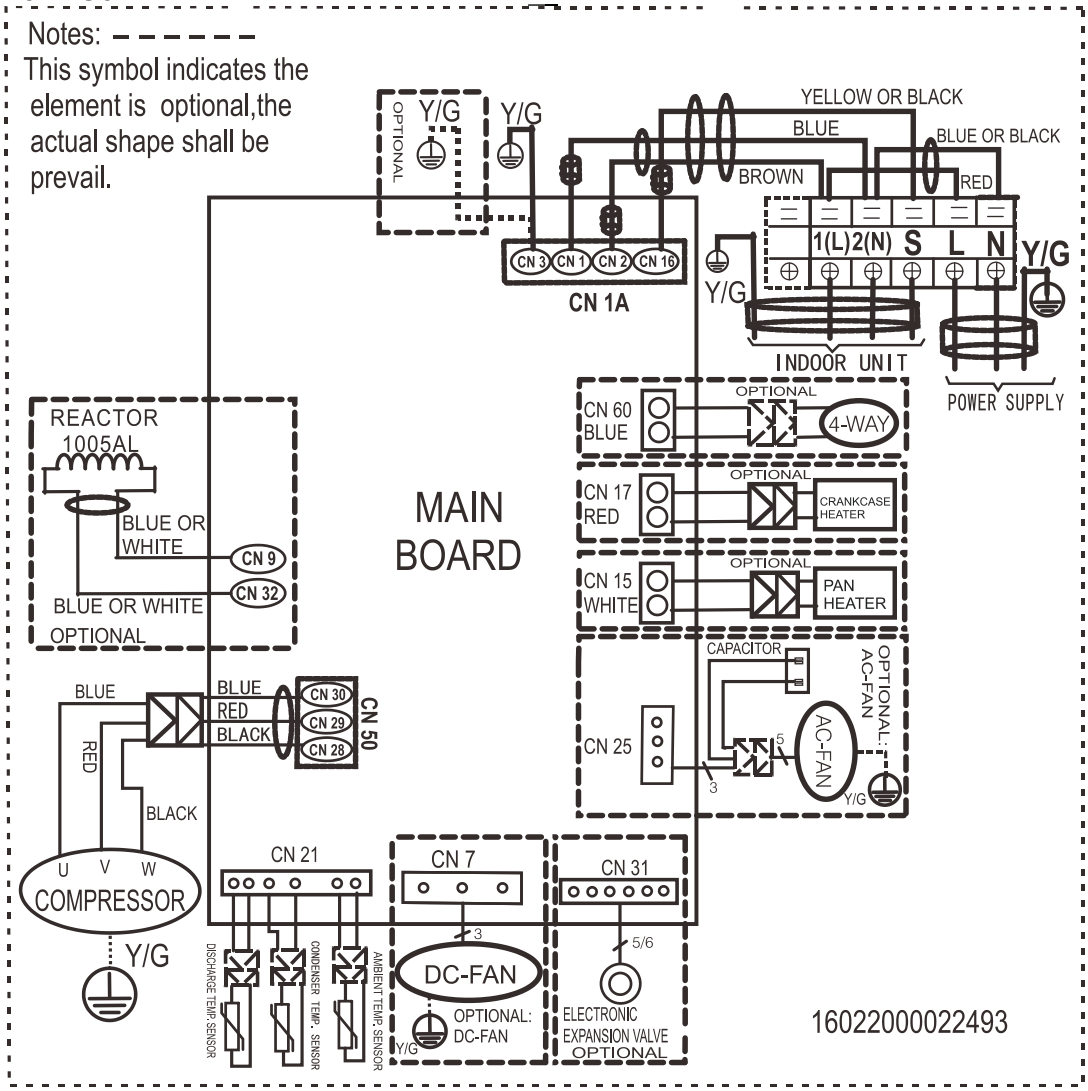
Model(KBtu/h)	Unit：mm					
	W	D	H	W1	A	B
12/16/18	800	333	554	870	514	340
24	845	363	702	914	540	350
30/36/42	946	410	810	1030	673	403

2. Service Space



3. Wiring Diagrams

V5MLO32-12



4. Piping Diagrams

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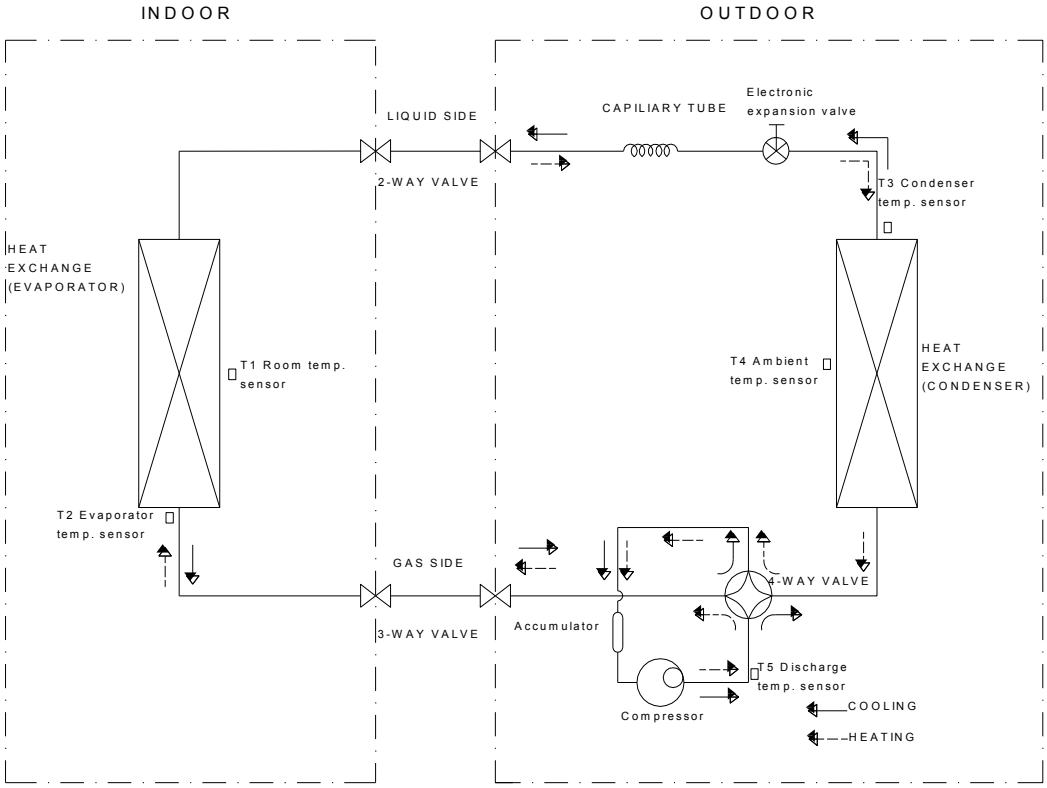


5. Electric Characteristics

Model	Outdoor Unit				Power Supply
	Hz	Voltage	Min.	Max.	MFA
V5MLO32-12	50	220-240V	198V	254V	16

Notes:
MFA: Max. Fuse Amps. (A)

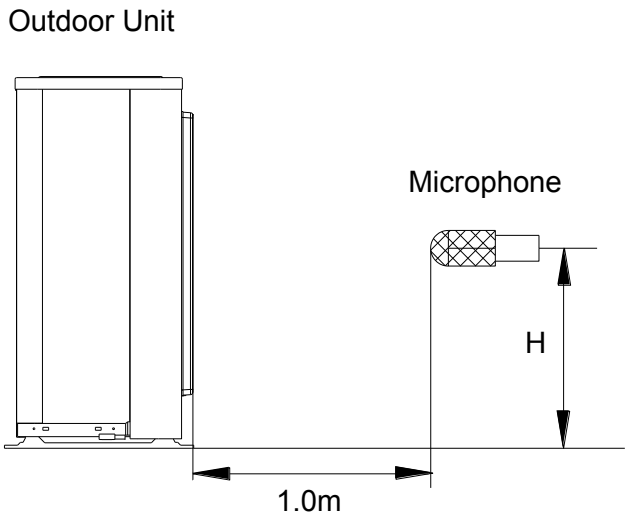
6. Operation Limits

Temperature / Mode	Cooling operation	Heating operation	Drying operation
Room temperature	17℃～32℃	0℃～30℃	17℃～32℃
Outdoor temperature	0℃～50℃ （-15℃～50℃：For the models with low temperature cooling system）	-15℃～24℃	0℃～50℃

CAUTION:

1. If the air conditioner is used beyond the above conditions, certain safety protection features may come into operation and cause the unit to operate abnormally.
2. The room relative humidity should be less than 80%. If the air conditioner operates beyond this figure, the surface of the air conditioner may attract condensation. Please set the vertical air flow louver to its maximum angle (vertically to the floor), and set HIGH fan mode.
3. The optimum performance will be achieved during this operating temperature zone.

7. Sound Levels

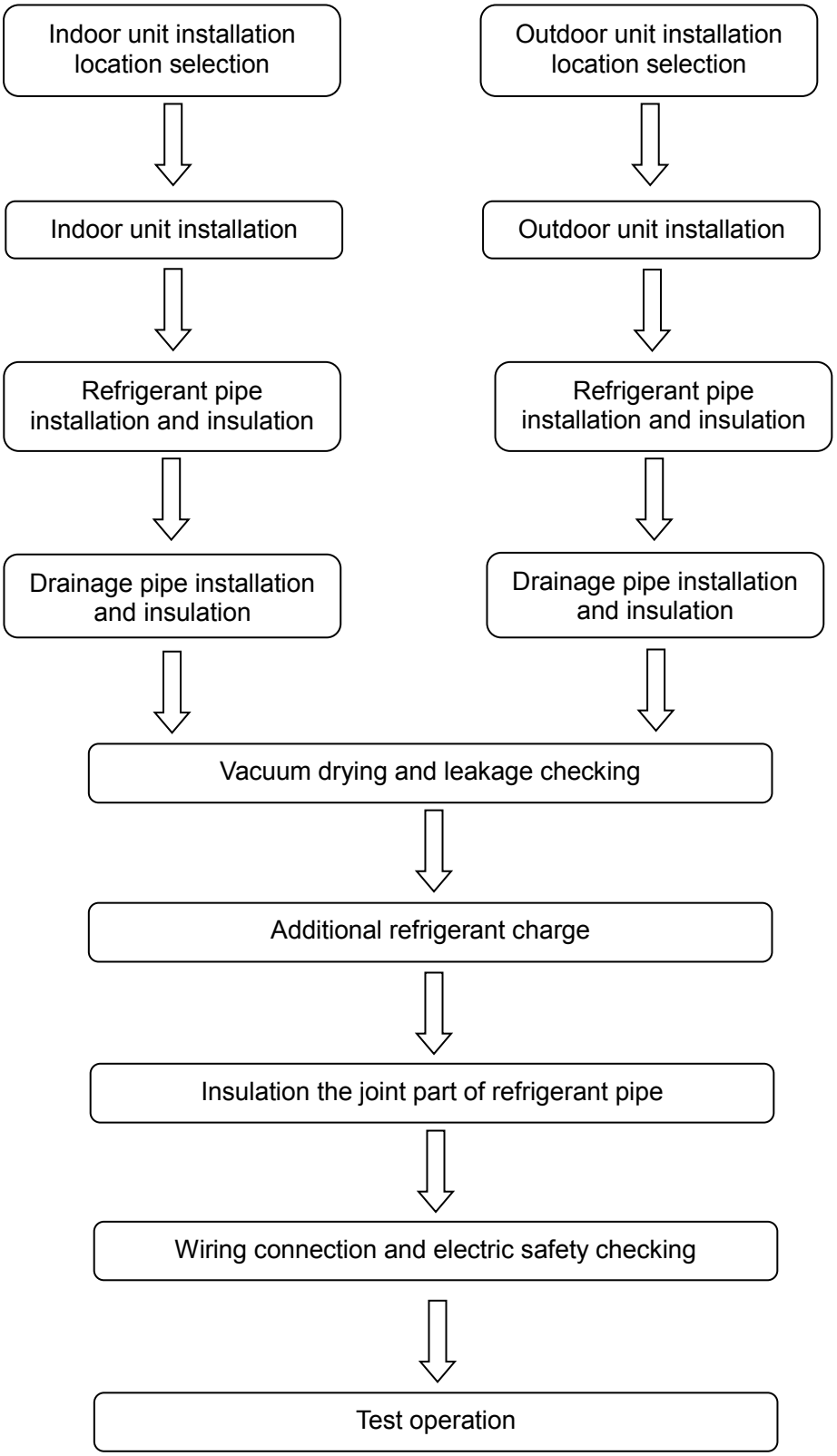


Note: H= 0.5 × height of outdoor unit

Model	Noise Power dB(A)	Noise level dB(A)
V5MLO32-12	60	57

Part 4
Installation

1. Installation Procedure



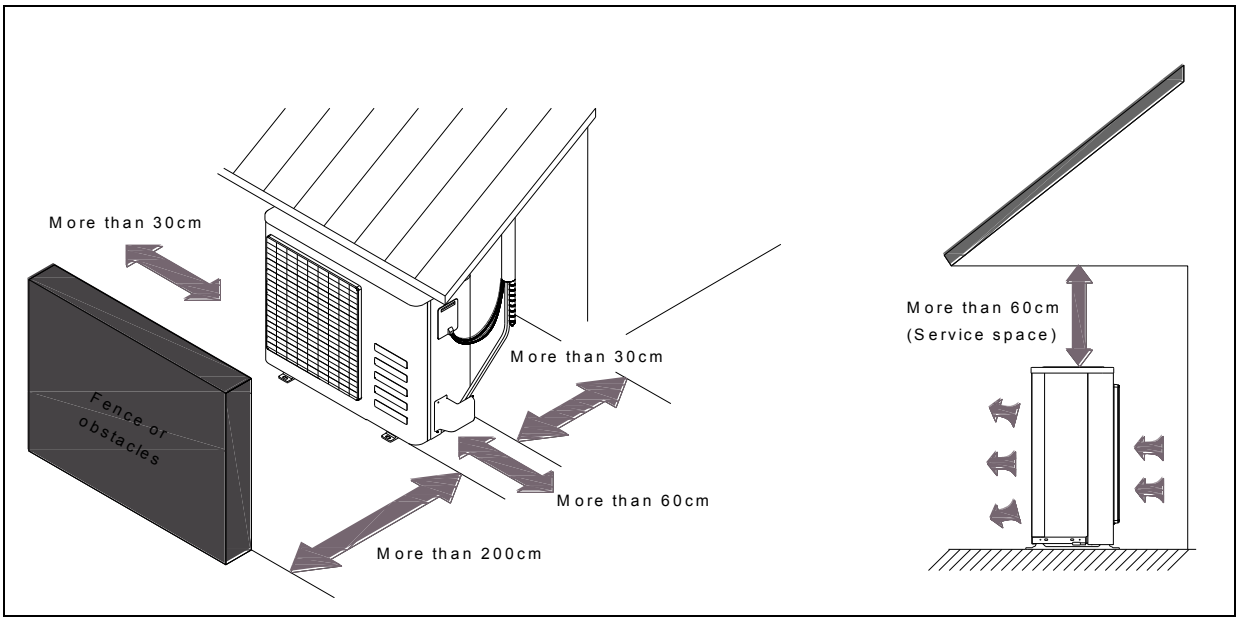
2. Location selection

2.1 Indoor unit location selection

- The place shall easily support the indoor unit's weight.
- The place can ensure the indoor unit installation and inspection.
- The place can ensure the indoor unit horizontally installed.
- The place shall allow easy water drainage.
- The place shall easily connect with the outdoor unit.
- The place where air circulation in the room should be good.
- There should not be any heat source or steam near the unit.
- There should not be any oil gas near the unit
- There should not be any corrosive gas near the unit
- There should not be any salty air neat the unit
- There should not be strong electromagnetic wave near the unit
- There should not be inflammable materials or gas near the unit
- There should not be strong voltage vibration.

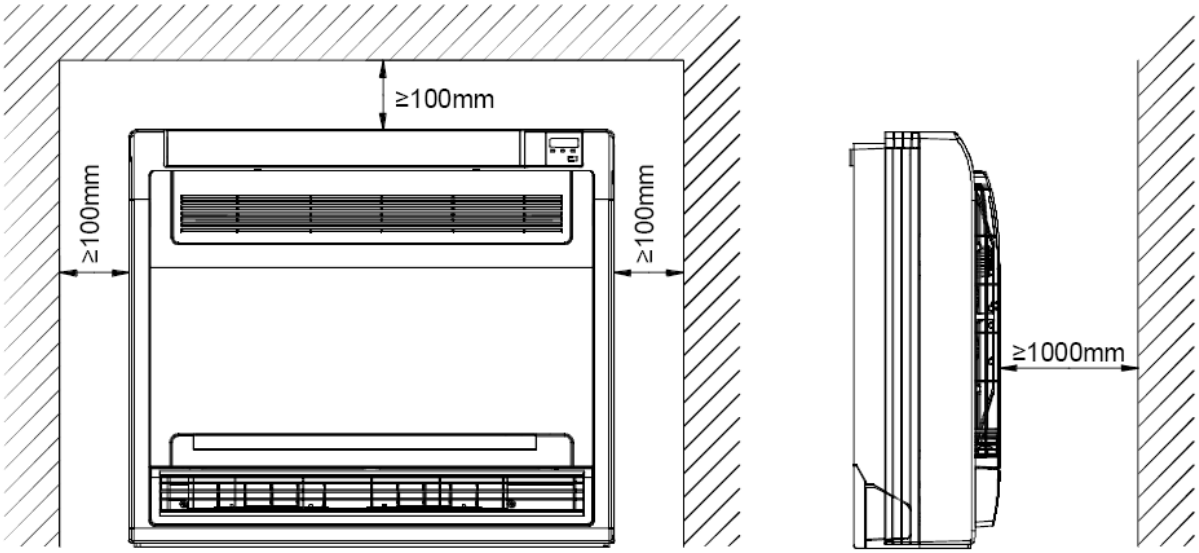
2.2 Outdoor unit location selection

- The place shall easily support the outdoor unit's weight.
- Locate the outdoor unit as close to indoor unit as possible
- The piping length and height drop can not exceed the allowable value.
- The place where the noise, vibration and outlet air do not disturb the neighbors.
- There is enough room for installation and maintenance.
- The air outlet and the air inlet are not impeded, and not face the strong wind.
- It is easy to install the connecting pipes and cables.
- There is no danger of fire due to leakage of inflammable gas.
- It should be a dry and well ventilation place
- The support should be flat and horizontal
- Do not install the outdoor unit in a dirty or severely polluted place, so as to avoid blockage of the heat exchanger in the outdoor unit.
- If is built over the unit to prevent direct sunlight, rain exposure, direct strong wend, snow and other scraps accumulation, make sure that heat radiation from the condenser is not restricted.



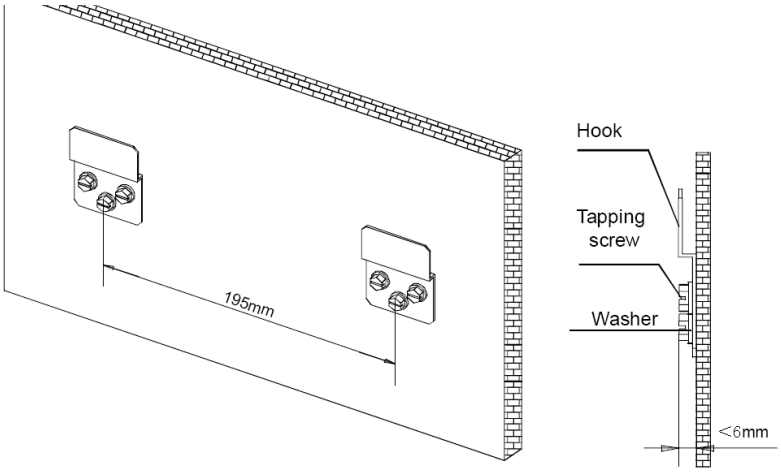
3 Console indoor unit installation

3. Service space for indoor unit



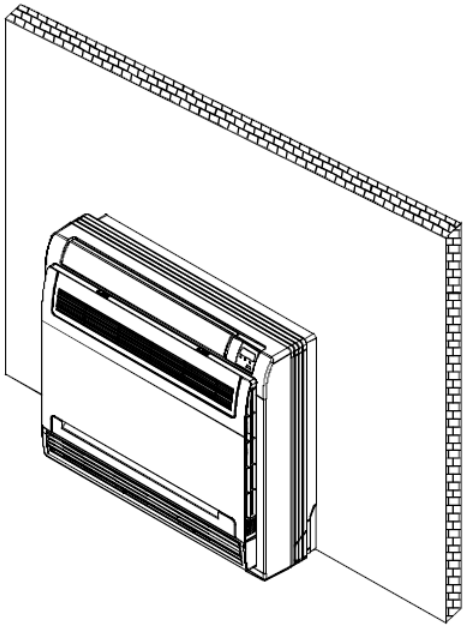
3. Install the main body

- Fix the hook with tapping screw onto the wall



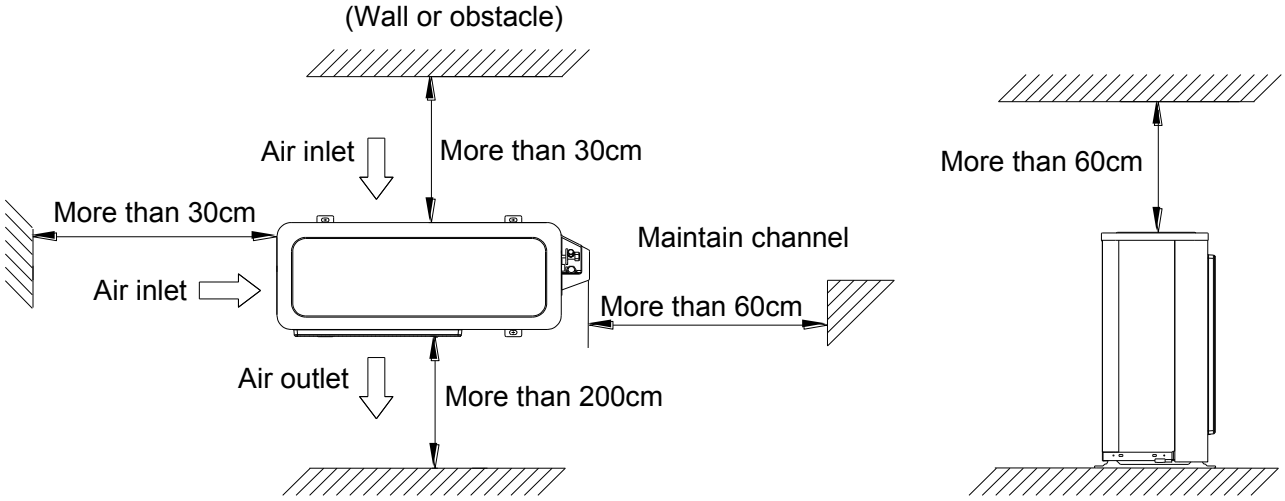
- Hang the indoor unit on the hook.

(The bottom of body can touch with floor or suspended, but the body must install vertically.)

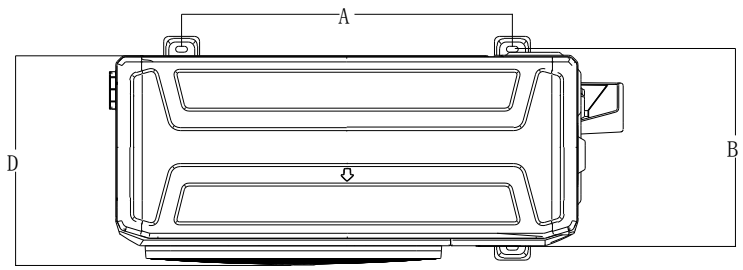


4. Outdoor unit installation (Side Discharge Unit)

4.1 Service space for outdoor unit



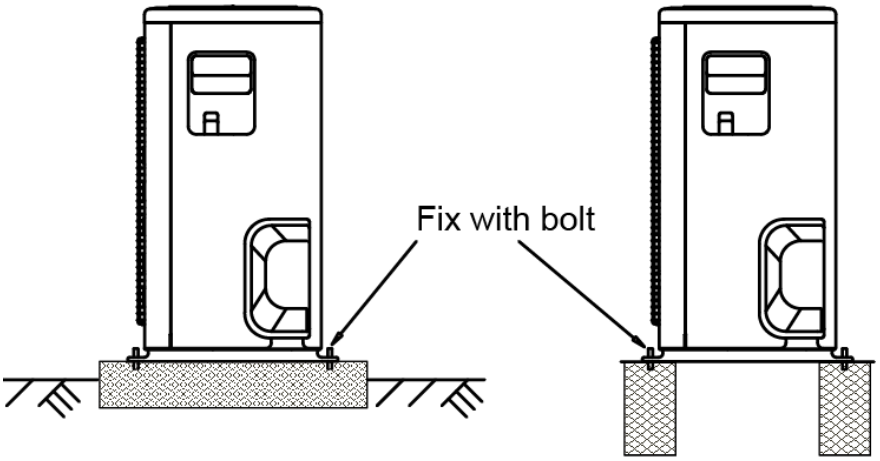
4.2 Bolt pitch



Model	A	B	D
12/16/18	514	340	333
24	540	350	363
30/36/42	673	403	410
48/55	634	404	415

4.3 Install the Unit

Since the gravity center of the unit is not at its physical center, so please be careful when lifting it with a sling.
Never hold the inlet of the outdoor unit to prevent it from deforming.
Do not touch the fan with hands or other objects.
Do not lean it more than 45, and do not lay it sidelong.
Make concrete foundation according to the specifications of the outdoor units.
Fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind.



5. Refrigerant pipe installation

5.1 Maximum pipe length and height drop

Considering the allowable pipe length and height drop to decide the installation position. Make sure the distance and height drop between indoor and outdoor unit not exceeded the date in the following table.

Model	Max. Length	Max. Elevation
12,000Btu/h	25m	10m
16,000~18,000Btu/h	30m	20m
24,000Btu/h~30,000Btu/h	50m	25m
36,000Btu/h ~60,000Btu/h	65m	30m

5.2 The procedure of connecting pipes

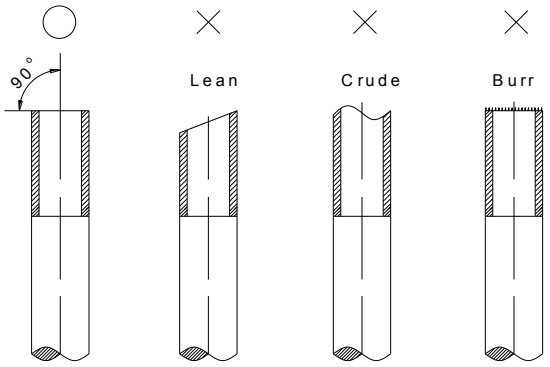
5.2.1 Choose the pipe size according to the specification table.

5.2.2 Confirm the cross way of the pipes.

5.2.3 Measure the necessary pipe length.

5.2.4 Cut the selected pipe with pipe cutter

- Make the section flat and smooth.

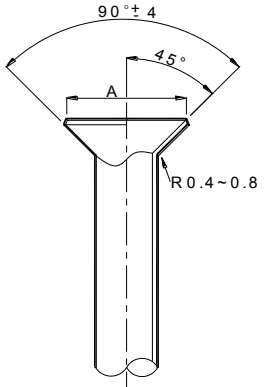


5.2.5 Insulate the copper pipe

- Before test operation, the joint parts should not be heat insulated.

5.2.6 Flare the pipe

- Insert a flare nut into the pipe before flaring the pipe
- According to the following table to flare the pipe

Pipe diameter	Flare dimension A (mm)		Flare shape
	Min	Max	
1/4" (6.35)	8.3	8.7	
3/8" (9.52)	12.0	12.4	
1/2" (12.7)	15.4	15.8	
5/8" (15.9)	18.6	19.1	
3/4" (19)	22.9	23.3	

- After flared the pipe, the opening part must be seal by end cover or adhesive tape to avoid duct or exogenous impurity come into the pipe.

5.2.7 Drill holes if the pipes need to pass the wall.

5.2.8 According to the field condition to bend the pipes so that it can pass the wall smoothly.

5.2.9 Bind and wrap the wire together with the insulated pipe if necessary.

5.2.10 Set the wall conduit

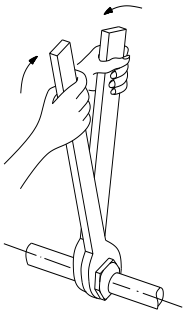
5.2.11 Set the supporter for the pipe.

5.2.12 Locate the pipe and fix it by supporter

- For horizontal refrigerant pipe, the distance between supporters should not be exceed 1m.
- For vertical refrigerant pipe, the distance between supporters should not be exceed 1.5m.

5.2.13 Connect the pipe to indoor unit and outdoor unit by using two spanners.

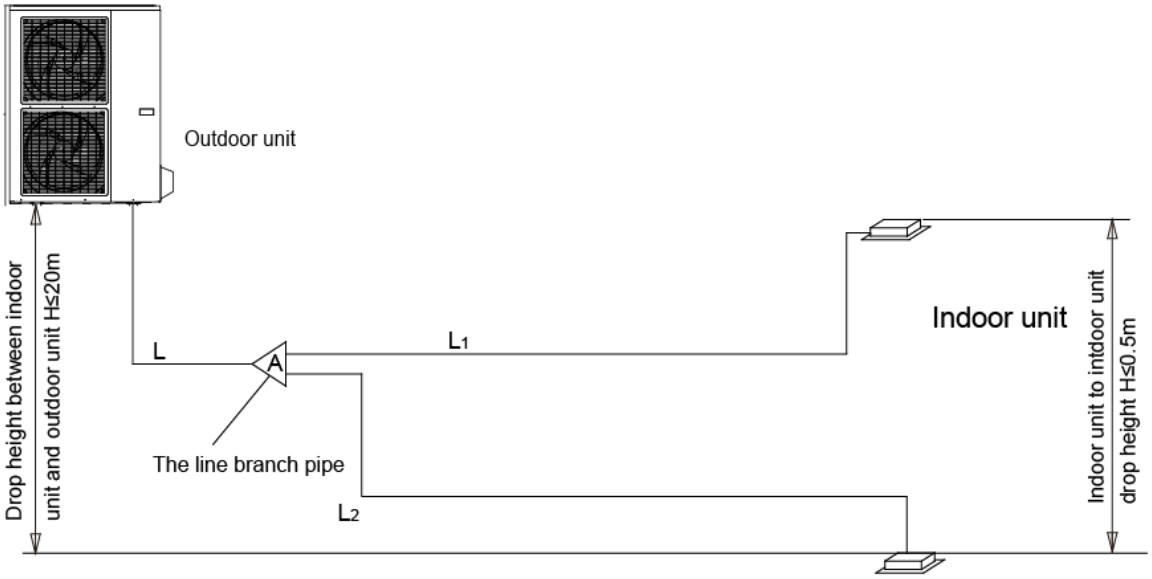
- Be sure to use two spanners and proper torque to fasten the nut, too large torque will damage the bellmouthing, and too small torque may cause leakage. Refer the following table for different pipe connection.

Pipe Diameter	Torque		Sketch map
	(kgf.cm)	(N.cm)	
1/4" (6.35)	144~176	1420~1720	
3/8" (9.52)	333~407	3270~3990	
1/2" (12.7)	504~616	4950~6030	
5/8" (15.9)	630~770	6180~7540	
3/4" (19)	990~1210	9270~11860	

5.3 For Units with Twins Function

5.3.1 Length and drop height permitted of the refrigerant piping

Note: Reduced length of the branching tube is the 0.5m of the equivalent length of the pipe.



Note: All used branch pipe must be produced by , otherwise it causes malfunction.
The indoor units should be installed equivalently at the both side of the U type branch pipe.

		Permitted Value		Piping
Pipe Length	Total pipe length (Actual)	18K+18K	30m	L+L1+L2
		24K+24K	50m	
		30K+30K	50m	
	Max. branch pipe length		15m	L1, L2
	Max. branch pipe length difference		10m	L1-L2
Drop Height	Max. height difference between indoor unit and outdoor unit		20m	H1
	Max. height difference between indoor units		0.5m	H2

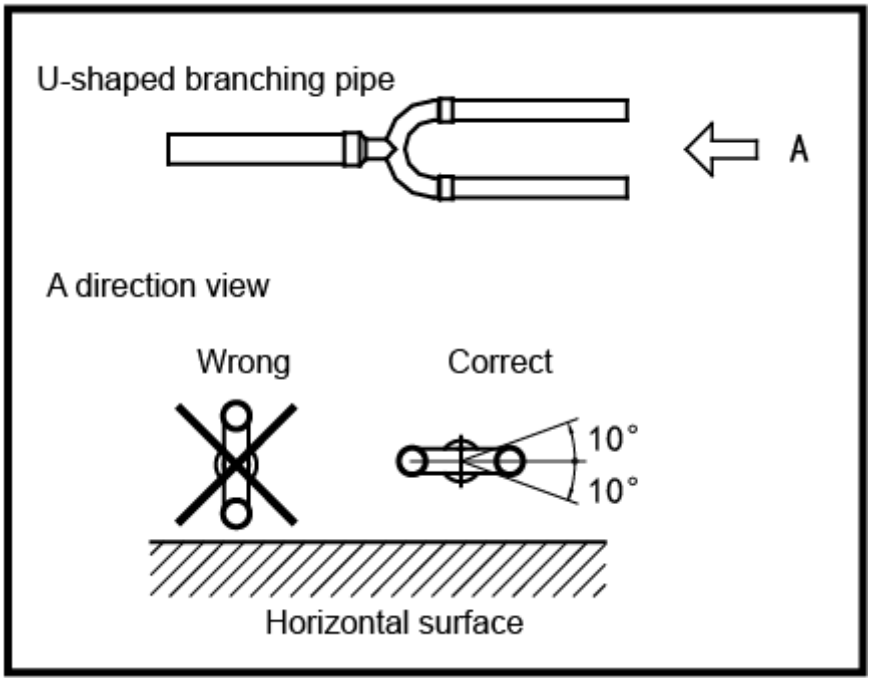
5.3.2 Size of joint pipes for indoor unit (R410a)

Capacity of indoor unit (A)	Size of main pipe(mm)		
	Gas side	Liquid side	Available branching pipe
18K	Φ12.7	Φ6.35	CE-FQZHN-01C
24K	Φ15.9	Φ9.5	CE-FQZHN-01C
30K	Φ15.9	Φ9.5	CE-FQZHN-01C

5.3.3 Size of joint pipes for outdoor unit (R410a)

Model	the size of main pipe(mm)		
	Gas side	Liquid side	The 1st branching pipe
36K	Φ15.9	Φ9.5	CE-FQZHN-01C
48K	Φ15.9	Φ9.5	CE-FQZHN-01C
60K	Φ15.9	Φ9.5	CE-FQZHN-01C

5.3.4 The branching pipe must be installed horizontally, error angle of it should not large than 10°. Otherwise, malfunction will be caused.


U-shaped branching pipe
A
A direction view
Wrong
Correct
10°
10°
Horizontal surface

6. Drainage pipe installation

Install the drainage pipe as shown below and take measures against condensation. Improperly installation could lead to leakage and eventually wet furniture and belongings.

6.1 Installation principle

- Ensure at least 1/100 slope of the drainage pipe
- Adopt suitable pipe diameter
- Adopt nearby condensate water discharge

6.2 Key points of drainage water pipe installation

6.2.1 Considering the pipeline route and elevation

- Before installing condensate water pipeline, determine its route and elevation to avoid intersection with other pipelines and ensure slope is straight.

6.2.2 Drainage pipe selection

- The drainage pipe diameter shall not small than the drain hose of indoor unit
- According to the water flowrate and drainage pipe slope to choose the suitable pipe, the water flowrate is decided by the capacity of indoor unit.

Relationship between water flowrate and capacity of indoor unit

Capacity (x1000Btu)	Water flowrate (l/h)
12	2.4
18	4
24	6
30	7
36	8
42	10
48	12
60	14

According to the above table to calculate the total water flowrate for the confluence pipe selection.

For horizontal drainage pipe (The following table is for reference)

PVC pipe	Reference value of inner diameter of pipe (mm)	Allowable maximum water flowrate (l/h)		Remark
		Slope 1/50	Slope 1/100	
PVC25	20	39	27	For branch pipe
PVC32	25	70	50	
PVC40	31	125	88	Could be used for confluence pipe
PVC50	40	247	175	
PVC63	51	473	334	

Attention: Adopt PVC40 or bigger pipe to be the main pipe.

For Vertical drainage pipe (The following table is for reference)

PVC pipe	Reference value of inner diameter of pipe (mm)	Allowable maximum water flowrate (l/h)	Remark
PVC25	20	220	For branch pipe
PVC32	25	410	
PVC40	31	730	Could be used for confluence pipe
PVC50	40	1440	
PVC63	51	2760	
PVC75	67	5710	
PVC90	77	8280	

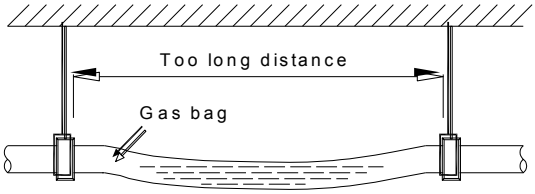
Attention: Adopt PVC40 or bigger pipe to be the main pipe.

6.2.3 Individual design of drainage pipe system

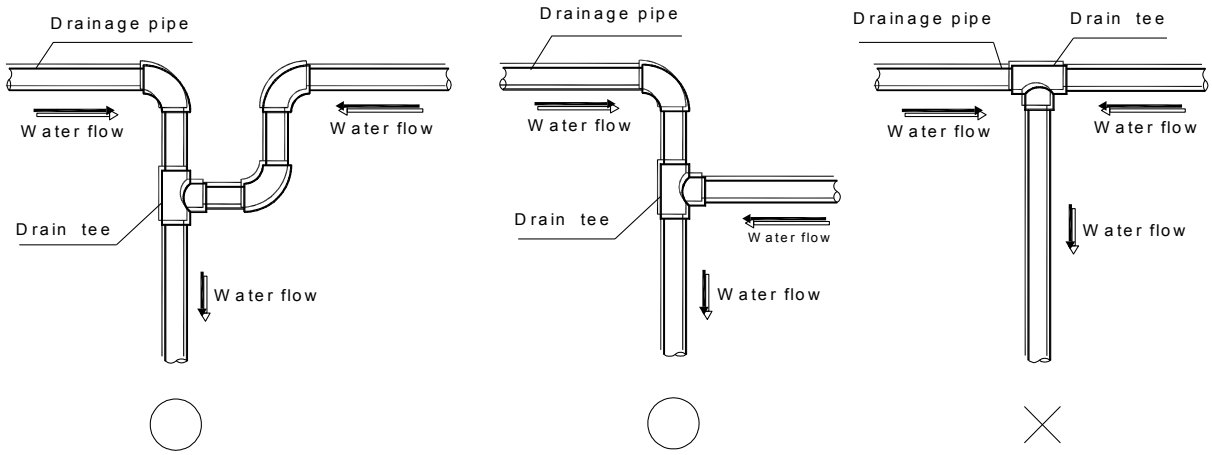
- The drainage pipe of air conditioner shall be installed separately with other sewage pipe, rainwater pipe and drainage pipe in building.
- The drainage pipe of the indoor unit with water pump should be apart from the one without water pump.

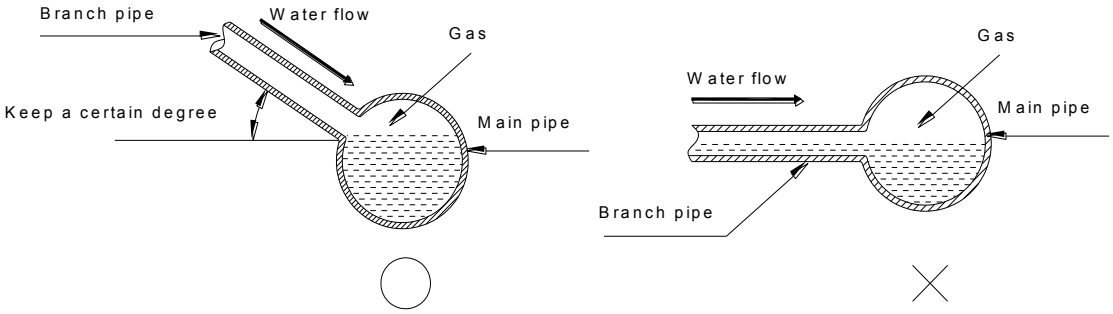
6.2.4 Supporter gap of drainage pipe

- In general, the supporter gap of the drainage pipe horizontal pipe and vertical pipe is respectively 1m~1.5m and 1.5m~2.0m.
- Each vertical pipe shall be equipped with not less than two hangers.
- Overlarge hanger gap for horizontal pipe shall create bending, thus leading to air block.



6.2.5 The horizontal pipe layout should avoid converse flow or bad flow

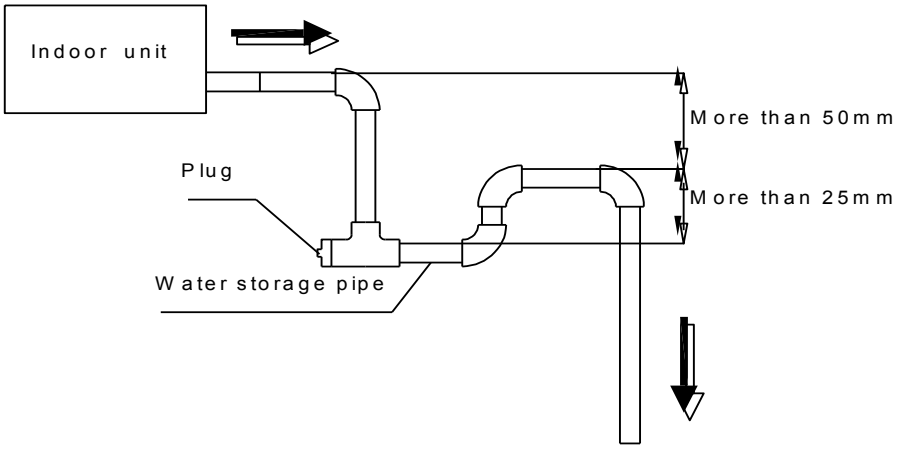




- The correct installation will not cause converse water flow and the slope of the branch pipes can be adjusted freely
- The false installation will cause converse water flow and the slope of the branch pipe can not be adjusted.

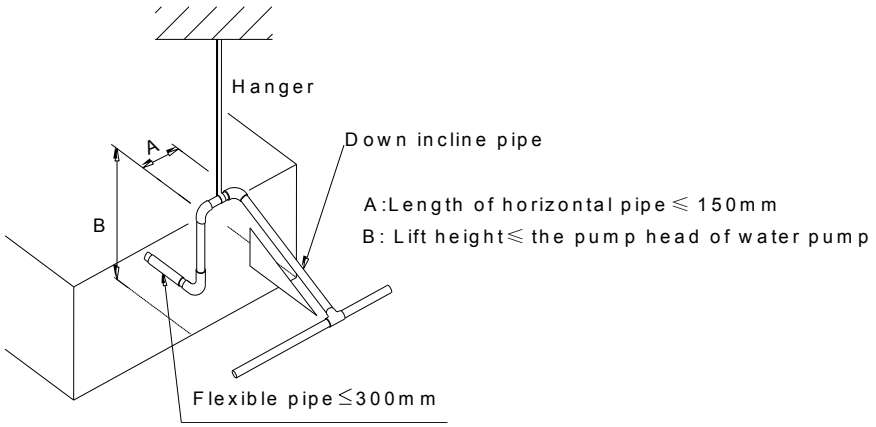
6.2.6 Water storage pipe setting

- If the indoor unit has high extra static pressure and without water pump to elevate the condensate water, such as high extra static pressure duct unit , the water storage pipe should be set to avoid converse flow or blow water phenomena.



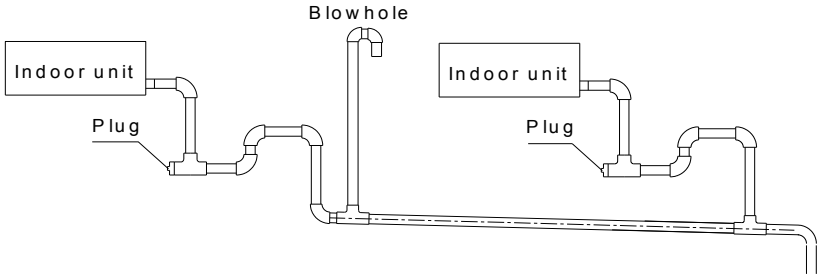
6.2.7 Lifting pipe setting of indoor unit with water pump

- The length of lifting pipe should not exceed the pump head of indoor unit water pump.
  Pump head of big four way cassette: 750mm
  Pump head of compact four way cassette: 500mm
- The drainage pipe should be set down inclined after the lifting pipe immediately to avoid wrong operation of water level switch.
- Refer the following picture for installation reference.



6.2.8 Blowhole setting

- For the concentrated drainage pipe system, there should design a blowhole at the highest point of main pipe to ensure the condensate water discharge smoothly.
- The air outlet shall face down to prevent dirt entering pipe.
- Each indoor unit of the system should be installed it.
- The installation should be considering the convenience for future cleaning.



6.2.9 The end of drainage pipe shall not contact with ground directly.

6.3 Drainage test

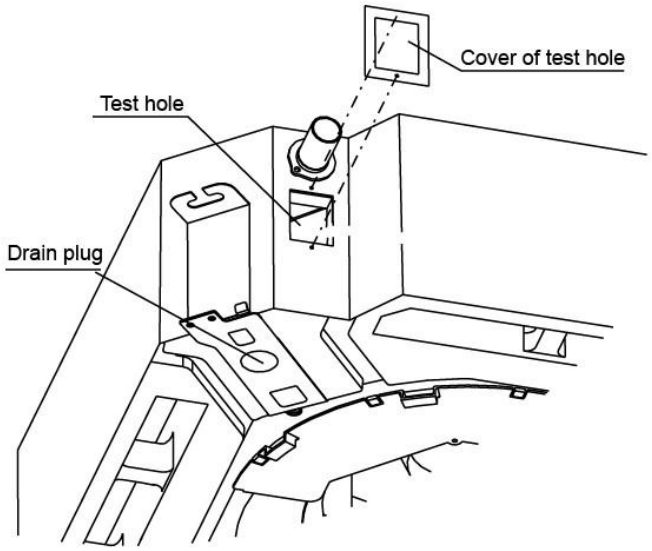
6.3.1 Water leakage test

After finishing the construction of drainage pipe system, fill the pipe with water and keep it for 24 hours to check whether there is leakage at joint section.

6.3.2 Water discharge test

1. Natural drainage mode(the indoor unit with outdoor drainage pump)
   Infuse above 600ml water through water test hole slowly into the water collector, observe whether the water can discharge through the transparent hard pipe at drainage outlet.
2. Pump drainage mode

2.1 Disconnect the plug of water level switch, remove the cover of water test hole and slowly infuse about 2000ml water through the water test hole, be sure that the water will not touch the motor of drainage pump.



2.2 Power on and let the air conditioner operate for cooling. Check operation status of drainage pump, and then connect the plug of water level switch, check the operation sound of water pump and observe whether the water can discharge through the transparent hard pipe at drainage outlet. (In light of the length of drainage pipe, water shall be discharged about 1 minute delayed)

2.3 Stop the operation of air conditioner, power off the power supply and put the cover of water test hole back to the original place.

a. After stopped the air conditioner 3 minutes, check whether there is anything abnormal. If drainage pipes have not been distributed properly, over back-flow water shall cause the flashing of alarm indicator at remote-controlled receiving board and even water shall run over the water collector.

b. Continuously infusing water until water level alarmed, check whether the drainage pump could discharge water at once. If water level does not decline under warning water level 3 minutes later, it shall cause shutdown of unit. When this situation happens, the normal startup only can be recovered by turning down power supply and eliminating accumulated water.

Note: Drain plug at the main water-containing plate is used for eliminating accumulated water in water-containing plate when maintaining air conditioner fault. During normal operation, the plug shall be filled in to prevent leakage.

6.4 Insulation work of drainage pipe

Refer the introduction to the insulation engineering parts.

7. Vacuum Drying and Leakage Checking

4.1 Purpose of vacuum drying

- Eliminating moisture in system to prevent the phenomena of ice-blockage and copper oxidation. Ice-blockage shall cause abnormal operation of system, while copper oxide shall damage compressor.
- Eliminating the non-condensable gas (air) in system to prevent the components oxidizing, pressure fluctuation and bad heat exchange during the operation of system.

4.2 Selection of vacuum pump

- The ultimate vacuum degree of vacuum pump shall be -756mmHg or above.
- Precision of vacuum pump shall reach 0.02mmHg or above.

4.3 Operation procedure for vacuum drying

Due to different construction environment, two kinds of vacuum drying ways could be chosen, namely ordinary vacuum drying and special vacuum drying.

7.3.1 Ordinary vacuum drying

1. When conduct first vacuum drying, connect pressure gauge to the infusing mouth of gas pipe and liquid pipe, and keep vacuum pump running for 1hour (vacuum degree of vacuum pump shall be reached -755mmHg).
2 If the vacuum degree of vacuum pump could not reach -755mmHg after 1 hour of drying, it indicates that there is moisture or leakage in pipeline system and need to go on with drying for half an hour.
3 If the vacuum degree of vacuum pump still could not reach -755mmHg after 1.5 hours of drying, check whether there is leakage source.
4 Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture or leak source.

7.3.2 Special vacuum drying

The special vacuum drying method shall be adopted when:

1. Finding moisture during flushing refrigerant pipe.
2. Conducting construction on rainy day, because rain water might penetrated into pipeline.
3. Construction period is long, and rain water might penetrated into pipeline.
4. Rain water might penetrate into pipeline during construction.

Procedures of special vacuum drying are as follows:

1. Vacuum drying for 1 hour.
2. Vacuum damage, filling nitrogen to reach 0.5Kgf/cm2 .
   Because nitrogen is dry gas, vacuum damage could achieve the effect of vacuum drying, but this method could not achieve drying thoroughly when there is too much moisture. Therefore, special attention shall be drawn to prevent the entering of water and the formation of condensate water.
3. Vacuum drying again for half an hour.
   If the pressure reached -755mmHg, start to pressure leakage test. If it cannot reached the value, repeat vacuum damage and vacuum drying again for 1 hour.
4 Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture or leak source.

8. Additional refrigerant charge

- After the vacuum drying process is carried out, the additional refrigerant charge process need to be performed.
- The outdoor unit is factory charged with refrigerant. The additional refrigerant charge volume is decided by the diameter and length of the liquid pipe between indoor and outdoor unit. Refer the following formula to calculate the charge volume.

Diameter of liquid pipe (mm)	Φ6.35	Φ9.52
Formula	V=15g/m×(L-5)	V=30g/m×(L-5)

V: Additional refrigerant charge volume (g).

L : The length of the liquid pipe (m).

Note:

- Refrigerant may only be charged after performed the vacuum drying process.
- Always use gloves and glasses to protect your hands and eyes during the charge work.
- Use electronic scale or fluid infusion apparatus to weight refrigerant to be recharged. Be sure to avoid extra refrigerant charged, it may cause liquid hammer of the compressor or protections.
- Use supplementing flexible pipe to connect refrigerant cylinder, pressure gauge and outdoor unit. And The refrigerant should be charged in liquid state. Before recharging, The air in the flexible pipe and manifold gauge should be exhausted.
- After finished refrigerant recharge process, check whether there is refrigerant leakage at the connection joint part.(Using gas leakage detector or soap water to detect).

9. Engineering of insulation

9.1 Insulation of refrigerant pipe

9.1.1 Operational procedure of refrigerant pipe insulation

Cut the suitable pipe → insulation (except joint section) → flare the pipe → piping layout and connection→ vacuum drying → insulate the joint parts

9.1.2 Purpose of refrigerant pipe insulation

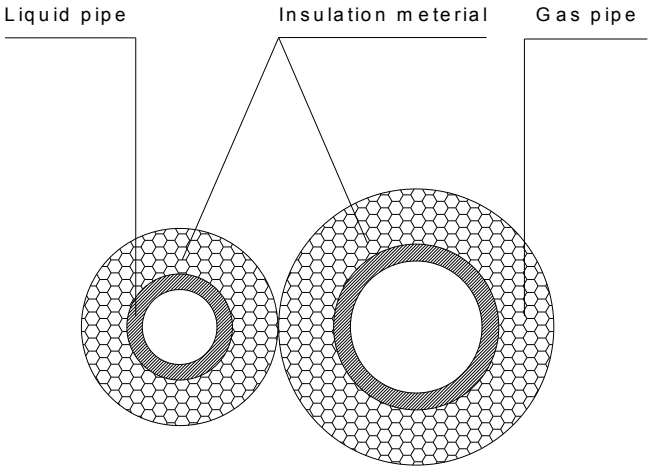
- During operation, temperature of gas pipe and liquid pipe shall be over-heating or over-cooling extremely. Therefore, it is necessary to carry out insulation; otherwise it shall debase the performance of unit and burn compressor.
- Gas pipe temperature is very low during cooling. If insulation is not enough, it shall form dew and cause leakage.
- Temperature of gas pipe is very high (generally 50-100℃) during heating. Insulation work must be carried out to prevent hurt by carelessness touching.

9.1.3 Insulation material selection for refrigerant pipe

- The burning performance should over 120℃
- According to the local law to choose insulation materials
- The thickness of insulation layer shall be above 10mm.If in hot or wet environment place, the layer of insulation should be thicker accordingly.

9.1.4 Installation highlights of insulation construction

- Gas pipe and liquid pipe shall be insulated separately, if the gas pipe and liquid pipe were insulated together; it will decrease the performance of air conditioner.



- The insulation material at the joint pipe shall be 5~10cm longer than the gap of the insulation material.
- The insulation material at the joint pipe shall be inserted into the gap of the insulation material.
- The insulation material at the joint pipe shall be banded to the gap pipe and liquid pipe tightly.
- The linking part should be use glue to paste together
- Be sure not bind the insulation material over-tight, it may extrude out the air in the material to cause bad insulation and cause easy aging of the material.

9.2 Insulation of drainage pipe

9.2.1 Operational procedure of refrigerant pipe insulation

Select the suitable pipe → insulation (except joint section) → piping layout and connection→ drainage test→ insulate the joint parts

9.2.2 Purpose of drainage pipe insulation

The temperature of condensate drainage water is very low. If insulation is not enough, it shall form dew and cause leakage to damage the house decoration.

9.2.3 Insulation material selection for drainage pipe

- The insulation material should be flame retardant material, the flame retardancy of the material should be selected according to the local law.
- Thickness of insulation layer is usually above 10mm.
- Use specific glue to paste the seam of insulation material, and then bind with adhesive tape. The width of tape shall not be less than 5cm. Make sure it is firm and avoid dew.

9.2.4 Installation and highlights of insulation construction

- The single pipe should be insulated before connecting to another pipe, the joint part should be insulated after the drainage test.
- There should be no insulation gap between the insulation material.

10. Engineering of electrical wiring

10.1 Highlights of electrical wiring installation

- All field wiring construction should be finished by qualified electrician.
- Air conditioning equipment should be grounded according to the local electrical regulations.
- Current leakage protection switch should be installed.
- Do not connect the power wire to the terminal of signal wire.
- When power wire is parallel with signal wire, put wires to their own wire tube and remain at least 300mm gap.
- According to table in indoor part named “the specification of the power” to choose the wiring, make sure the selected wiring not small than the date showing in the table.
- Select different colors for different wire according to relevant regulations.
- Do not use metal wire tube at the place with acid or alkali corrosion, adopt plastic wire tube to replace it.
- There must be not wire connect joint in the wire tube If joint is a must, set a connection box at the place.
- The wiring with different voltage should not be in one wire tube.
- Ensure that the color of the wires of outdoor and the terminal No. are same as those of indoor unit respectively.

11. Test operation

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

11.2 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.

11.3 Test operation

Set the air conditioner under the mode of "COOLING" by remote controller, and check the following points.

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 temporary buttons works well.
- 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 refrigerant is leaked.

Part 5
Electrical Control System

1. Electrical Control Function

1.1 Abbreviation

T1: Indoor room temperature

T2: Middle indoor heat exchanger coil temperature

T2B: Indoor heat exchanger exhaust coil temperature

T3: Outdoor heat exchanger pipe temperature

T4: Outdoor ambient temperature

T5: Compressor discharge temperature

1.2 Main Protection

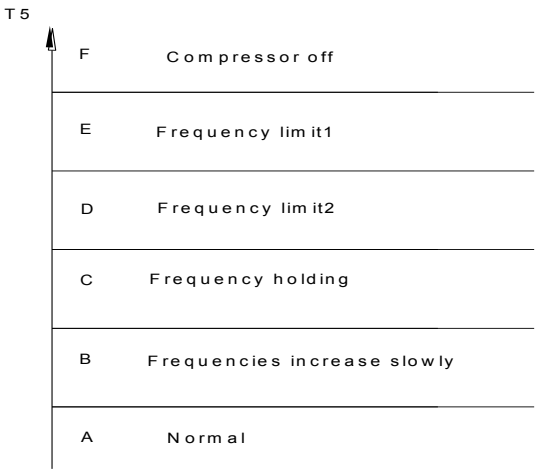
1.2.1 Compressor three-minute delay at restart

Compressor functions are delayed for up to one minute upon the first startup of the unit, and are delayed for up to three minutes upon subsequent unit restarts.

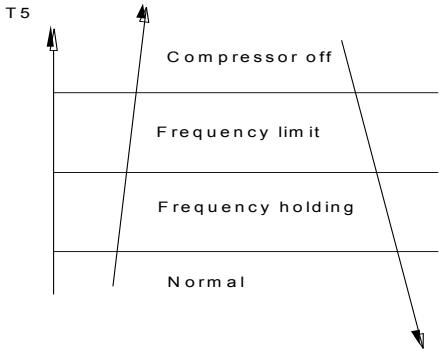
1.2.2 Automatic shutoff based on discharge temperature

When the discharge temperature of compressor rises, the running frequency is limited according to the following rules:

12K



16~60K



1.2.3 Automatic shutoff based on compressor top temperature

The unit ceases operation when the compressor top temperature exceeds a pre-determined threshold. The unit will restart after the temperature guard of the compressor top restarts.

1.2.4 Indoor Fan Delayed Open Function

When the unit starts up, the louver is immediately active . The indoor fan opens 7 seconds later.
If the unit runs in heating mode, the indoor fan is also regulated by the anti-cold wind function.

1.2.5 Fan Speed Malfunction

For console type:
If the indoor fan speed is lower than 300 RPM for certain time, the unit stops and the LED displays the failure code.

For A6 Duct:
If a fault occurs on the air volume regulator or the regulator enters protection mode, it sends the error message CF and an instruction to reduce fan speed to the master. The message and the instruction can be inquired with the remote controller or the wired controller. (Fault and protection information are displayed for one minute). After a fault occurs, the master unit shows the error code E3 and the fault count for one minute. If the fault occurs three times, then the fan is unable to resolve the problem independently. External shutdown by a remote controller, wired controller, or central controller must be used to clear the fan fault and fault count. The fan runs normally for 5 minutes while clearing fault count.

0： No malfunction
1：P0 Overcurrent
2：Overpressure
3：Overload
4：Over speed
5：Startup malfunction
6：Lack of phase
7：DC voltage too low
8：Communication fault
9：Parameter fault
10：L3 Current limited
11：L5 Voltage limited
12: Target speed cannot be met during the static pressure calculation process.

For other models:

If the indoor fan speed is lower than 300 RPM for 50 seconds or more, it shuts off and restarts in 30 seconds. If this happens 3 times, the unit stops and the LED displays the failure code.

1.3 Operation Modes and Functions

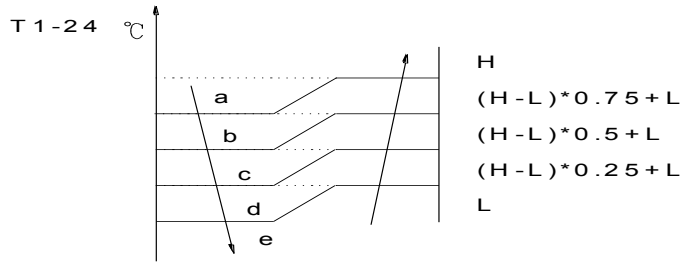
1.3.1 Fan Mode

(1) Outdoor fan and compressor cease operation.

(2) Temperature setting function is disabled, and no preset temperature is displayed.

(3) Louver operates the same as in cooling mode.

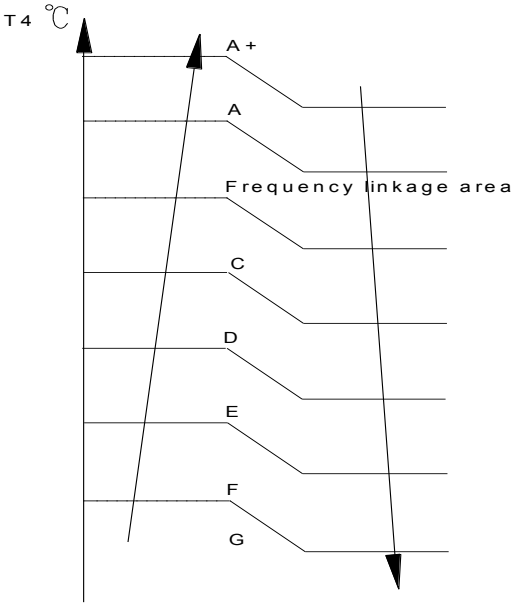
(4) Auto fan:
When it fan-only mode, operates the same as auto fan in cooling mode with the temperature set at 24℃.



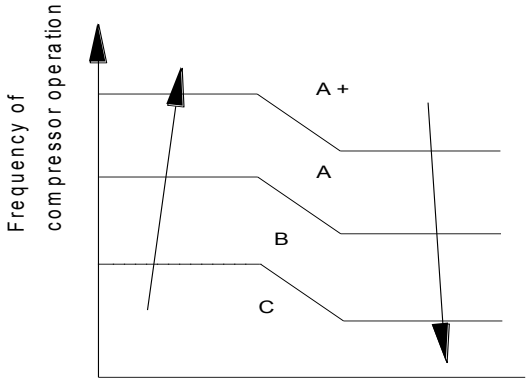
1.3.2 Cooling Mode

1.3.2.1 Outdoor Fan Running Guidelines

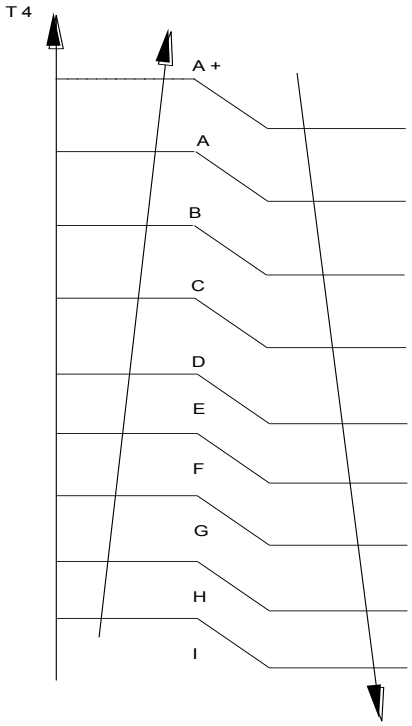
The outdoor unit can run at different fan speeds depending on T4.
Fan speeds vary with the model of air conditioner.
12K
Fan speed is regulated according to T4 and compressor frequency.



Frequency linkage area:

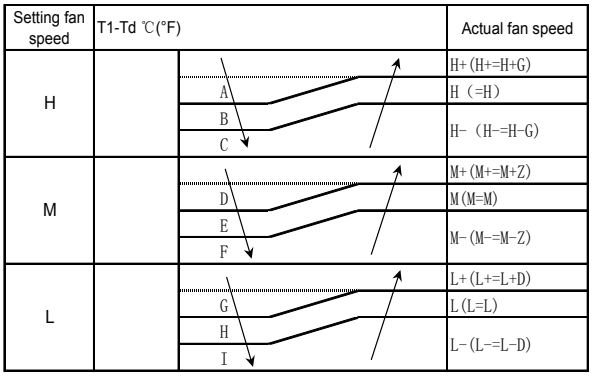


16~60K

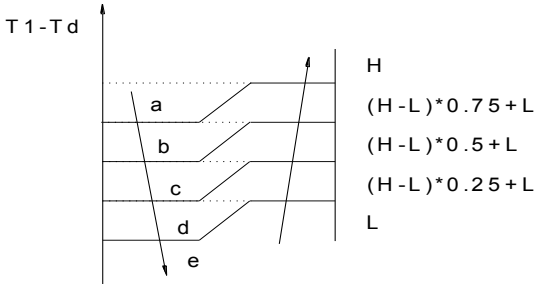


1.3.2.3 Indoor Fan Running Guidelines

In cooling mode, the indoor fan runs continuously and You can select the following speeds: high, medium, low, auto or silent. When the compressor is running, The indoor fan is regulated as illustrated as in the following figure:



The auto fan in cooling mode acts as follows:



1.3.2.3 Evaporator Low Temperature T2 Protection.

---T2<0℃, the compressor stops and restarts only when T2≥5℃.

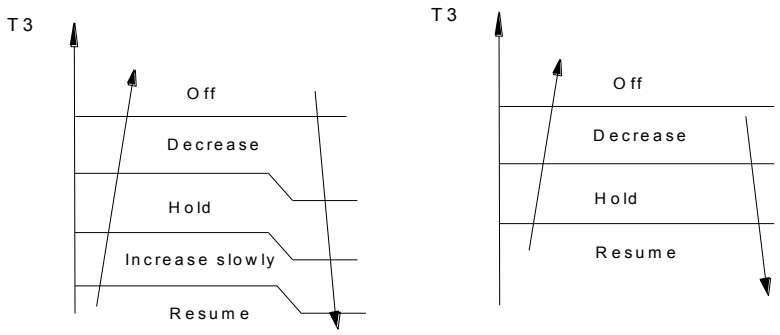
---0℃≤T2<4℃, the compressor frequency is limited and decreases to a lower level

---4℃≤T2<7℃, the compressor maintains its current frequency.

---T2>7℃, the compressor frequency is not limited.

1.3.2.4 High Condenser Coil Temperature Protection

12K **16~60K**



1.3.3 Heating Mode

1.3.3.1 Outdoor Fan Running Guidelines

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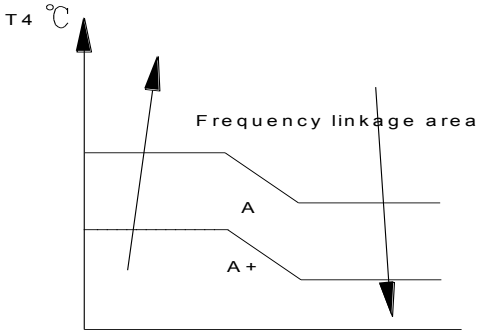
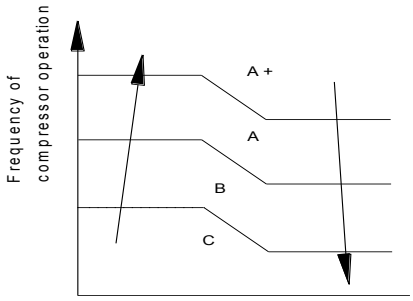
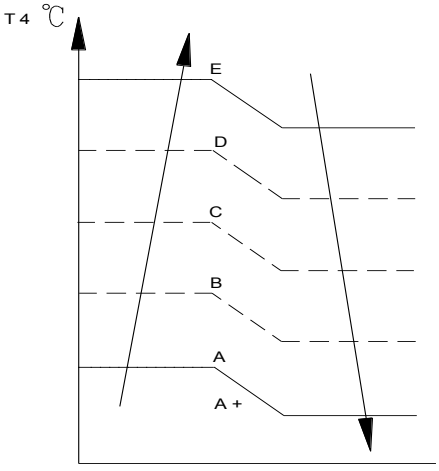
Fan speed is regulated according to T4 and compressor frequency.



Frequency linkage area:



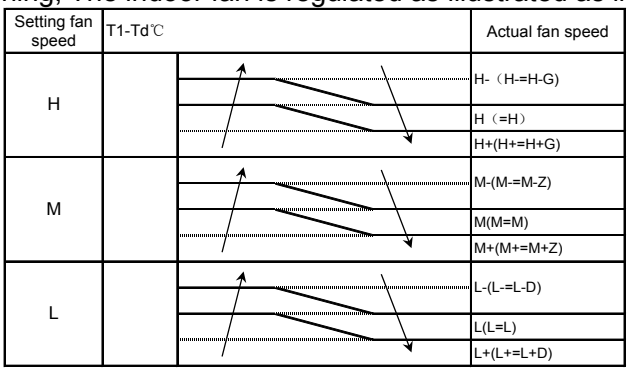
16~60K:



1.3.3.2 Indoor Fan Running Guidelines

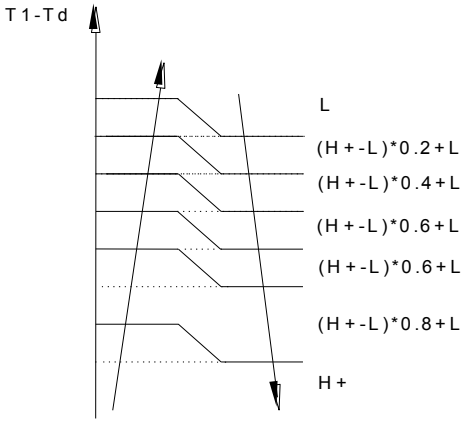
In heating mode, indoor fan speed can be set at high, medium, low, or auto fan, and the anti-cold-wind function is preferential.

When the compressor is running, The indoor fan is regulated as illustrated as in the following figure:



When the indoor temp reaches the preset temperature, the compressor stops and the indoor fan motor runs at the minimum speed (The anti-cold-wind is valid).

The auto fan in heating mode acts as follows:



1.3.3.3 Defrosting Control：

Conditions for defrosting:

----the unit enters the defrosting mode according to the value of T3 and T4 as well as the compressor running time.

Defrost Stop Conditions:

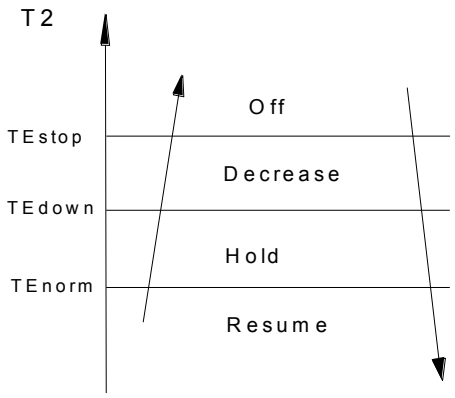
If any one of the following conditions is satisfied, defrosting ends and the unit returns to heating mode.

----T3 rises above than TCDE1℃.

----T3 remains at TCDE2℃ or above for 80 seconds.

----The machine runs for 10 consecutive minutes in defrosting mode.

1.3.3.4 High Evaporator Coil Temperature T2 Protection:



Off: Compressor stops.

Decrease: Decreases the running frequency.

Hold: Maintains the current frequency.

Resume: No limitation is applied to frequency.

.

1.3.4 Auto-mode

You can choose this mode with the remote control and adjust to temperature to between 17-30.

In auto mode, the machine chooses cooling, heating or fan-only mode according to ΔT (ΔT =T1-Ts).

ΔT=T1-Ts	Running mode
ΔT＞2℃	Cooling
-2<ΔT≤2℃	Fan-only
ΔT≤-2℃	Heating

The indoor fan runs at auto fan in each mode.

The louver operates the same in each mode.

If the machine switches mode between heating and cooling, the compressor stops for 15 minutes and then selects a mode again according to T1-Ts.

If the temperature is modified, the machine selects a running function.

1.3.5 Dehumidifier Mode

The indoor fan speed is fixed at breeze and can't be changed.

All protections are activated and operate the same as they do in cooling mode.

1.3.6 Timer Function

1.3.6.1 The timing range is 24 hours.

1.3.6.2 Timer On. The machine turns on automatically at the preset time.

1.3.6.3 Timer Off. The machine turns off automatically at the preset time.

1.3.6.4 Timer On/Off. The machine turns on automatically at the preset On Time, and then turns off automatically at the preset Off Time.

1.3.6.5 Timer Off/On. The machine turns on automatically at the preset Off Time and then turns off automatically at the preset On Time.

1.3.6.6 The timer does not change the unit operation mode. If the unit is off now, it does not start up immediately after the “timer off” function is set. When the setting time is reached, the timer LED switches ioff and the unit running mode remains unchanged.

1.3.6.7 The timer uses relative time, not clock time.

1.3.7 Sleep Mode

1.3.7.1 The sleep function is available in cooling, heating or auto mode.

1.3.7.2. The operational process in sleep mode is as follows:

When cooling, the temperature rises 1℃(to not higher than 30℃) every hour, 2 hours later the temperature stops rising and the indoor fan is fixed to low speed.

When heating, the temperature decreases 1℃ (to not lower than 17℃) every hour, 2 hours the temperature stops decreasing and the indoor fan is fixed at low speed. (Anti-cold wind function takes priority).

1.3.7.3 Sleep mode lasts a maximum of 7 hours. After 7 hours, the unit does not switch off., but for console, the unit switches off.

1.3.7.4 The timer uses relative time, not clock time.

1.3.8 Auto-Restart Function

The indoor unit has an auto-restart module that allows the unit to restart automatically. The module automatically stores the current settings (not including the Swing setting) and, in the case of a sudden power failure, will restore those setting automatically within 3 minutes after power returns.

1.3.9 Drain Pump Control (For Duct and Cassette)

Use the water-level switch to control drain pump.

The system checks the water level every 5 seconds.

----When the A/C operates in cooling (including auto cooling) or forced cooling mode, the pump begins running immediately and continuously until cooling stops.

----If the water level increases up to the control point, the LED displays an alarm code and the drain pump opens and continually monitors the water level. If the water level falls and LED alarm code is no longer displayed (drain pump close delay is 1 minute), the unit goes back into its last mode. Otherwise, the entire system (including the pump) stops and the LED displays an alarm again after 3 minutes.

1.3.10 Follow Me(Optional)

If you press "Follow Me" on the remote, the indoor unit will beep. This indicates the follow me function is active.

Once active, the remote control will send a signal every 3 minutes, with no beeps. The unit automatically sets the temperature according to the measurements from the remote control.

The unit will only change modes if the information from the remote control makes it necessary, not from the unit's temperature setting.

1.3.11 Outdoor Unit Point Check Function(Excluding 12K&16K)

A check switch is included on the outdoor PCB.

Push SW1 to check the unit's status while running. The digital display shows the following codes each time the SW1 is pushed.

N	Display	Remark		
00	Normal display	Displays running frequency, running state, or malfunction code		
01	Indoor unit capacity demand code	Actual data*HP*10 If a capacity demand code is higher than 99, the digital display shows single and double digits. For example, if the digital display shows “5.0”, the capacity demand is 15. If the digital display tube shows “60”, the capacity demand is 6.0.		
02	Amendatory capacity demand code			
03	The frequency after the capacity requirement transfer			
04	The frequency after the frequency limit			
05	The frequency of sending to 341			
06	Indoor unit evaporator outlet temperature (heating T2，cooling T2B)	If the temperature is lower than -9 ℃, the digital display shows “-9.” If the temperature is higher than 70 ℃, the digital display shows “70.” If the indoor unit is not connected, the digital display shows: “——”		
07	Condenser pipe temperature (T3)			
08	Outdoor ambient temperature (T4)			
09	Compressor discharge temperature (T5)	The display value is between 0–129 ℃. If the temperature is higher than 99 ℃, the digital display shows single and double digits. For example, if the digital display shows “0.5", the compressor discharge temperature is 105 ℃. If the digital display shows “1.6,” the compressor discharge temperature is 116 ℃.		
10	AD value of current	The display value is a hexidecimal number.		
11	AD value of voltage			
12	Indoor unit running mode code	Off:0, Fan only: 1,Cooling: 2, Heating: 3, Forced cooling: 4, Dry: 6, Self-clean: 8, Forced defrosting: 10		
13	Outdoor unit running mode code	Off:0, Fan only: 1,Cooling: 2, Heating: 3, Forced cooling: 4, Dry: 6, Self-clean: 8, Forced defrosting:10		
14	EXV open angle	Actual data/4. If the value is higher than 99, the digital display shows single and double digits. For example, if the digital display shows “2.0", the EXV open angle is 120×4=480p.		
15	Frequency limit symbol	Bit7	Frequency limit caused by IGBT radiator	The display value is a hexadecimal number. For example, the digital display show 2A, then Bit5=1, Bit3=1, and Bit1=1. It means frequency limit may be caused by T4, T3 or the current.
		Bit6	Frequency limit caused by PFC	
		Bit5	Frequency limit caused by T4.	
		Bit4	Frequency limit caused by T2.	
		Bit3	Frequency limit caused by T3.	
		Bit2	Frequency limit caused by T5.	
		Bit1	Frequency limit caused by current	
		Bit0	Frequency limit caused by voltage	

16	DC fan motor speed	0：Off, 1: Turbo, 2: High, 3: Medium, 4: Low, 5: Breeze, 6: Supper breeze
17	IGBT radiator temperature	The display value is between 0–30 ℃. If the temperature is higher than 99 ℃, the digital display shows single and double digits. For example, if the digital display shows “0.5", the IGBT radiator temperature is 105 ℃. If the digital display shows “1.6", the IGBT radiator temperature is 116 ℃.
18	Indoor unit number	The indoor unit can communicate with outdoor unit. General: 1, Twins: 2
19	Condenser pipe temperature of #1 indoor unit	If the temperature is lower than 0 ℃, the digital display shows “0”. If the temperature is higher than 70 ℃, the digital display shows “70.” If the capacity demand is 0, the digital display shows “0”. If the indoor unit is not connected, the digital display shows: “——”(heating T2，cooling T2B)
20	Condenser pipe temperature of #2 indoor unit	
21	Reserved	
22	#1 Indoor unit capacity demand code	Actual data*HP*10 If a capacity demand code is higher than 99, the digital display shows single and double digits. For example, if the digital display reads “5.0”, the capacity demand is 15. If the digital display shows “60”, the capacity demand is 6.0. If the indoor unit is not connected, the digital display shows: “——”
23	#2 Indoor unit capacity demand code	
24	Reserved	
25	Indoor room temperature of #1 indoor unit	If the temperature is lower than -9 ℃, the digital display shows “9”. If the temperature is higher than 70 ℃, the digital display shows “70”. If the capacity demand is 0, the digital display shows “0”. If the indoor unit is not connected, the digital display shows: “——”
26	Indoor room temperature of #2 indoor unit	If the temperature is lower than 0 ℃, the digital display shows “0”. If the temperature is higher than 70 ℃, the digital display shows “70”. If the capacity demand is 0, the digital display shows “0". If the indoor unit is not connected, the digital display shows: “——”
27	Average of indoor room temperature	If the temperature is lower than 0 ℃, the digital display shows “0”. If the temperature is higher than 70 ℃, the digital display shows “70”.
28	Shutdown cause	Refer to Appendix
29	T2B of #1 indoor unit	If the temperature is lower than -9 ℃, the digital display shows “9”. If the temperature is higher than 70 ℃, the digital display shows “70”. If the capacity demand is 0, the digital display shows “0”. If the indoor unit is not connected, the digital display shows: “——”

30	T2B of #2 indoor unit	If the temperature is lower than 0 ℃, the digital display shows "0". If the temperature is higher than 70 ℃, the digital display shows "70". If the capacity demand is 0, the digital display shows "0". If the indoor unit is not connected, the digital display shows: "——"

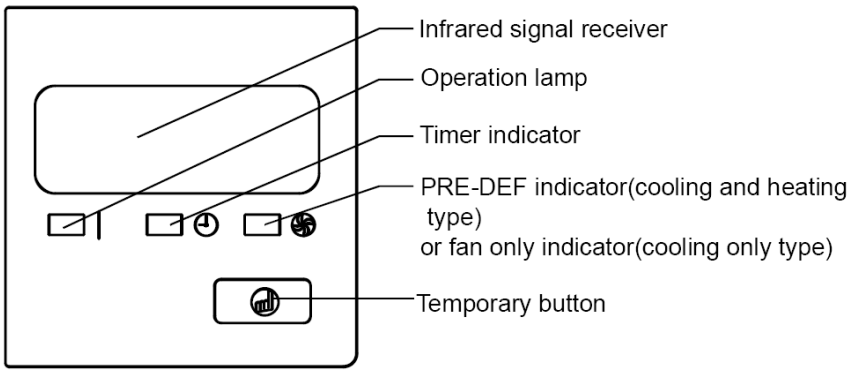
Appendix

Shutdown Causes	***Code***
Frequency limit caused by current	*1*
Frequency limit caused by T2 in cooling	*2*
Frequency limit caused by T2 in heating	*3*
Preset temperature reached	*4*
Frequency limit caused by T4	*5*
Defrosting	*6*
Mode switching	*7*
High discharge temperature protection	*9*
High evaporator coil temperature T2 protection	*10*
Evaporator low temperature T2 protection	*11*
Condenser high temperature T3 protection	*12*
Low indoor room temperature protection in drying mode	*13*
Low ambient temperature protection	*14*
Refrigerant leakage detection	*15*
Communication malfunction between indoor and outdoor units	*16*
Communication error between outdoor main chip and compressor driven chip IR341	*17*
AC power input voltage protection	*18*
Top temperature protection of compressor	*19*
Outdoor EE Malfunction	*20*
Fan speed malfunction	*21*
Temperature sensor open or short circuit	*22*
Overcurrent protection	*23*
IMP overcurrent protection	*24*
Compressor lack of phase	*25*
Compressor malfunction	*26*
Low pressure protection of 311	*27*
Fan current protection	*28*
Fan lack of phase	*29*
Fan zero speed protection	*30*
PFC module protection	*31*
High pressure protection of 311	*32*
Zero speed malfunction	*33*
PWM malfunction	*34*
MCE malfunction	*35*
Compressor overcurrent protection	*36*
Compressor EE malfunction	*37*
Compressor start-up malfunction	*38*
311 fan speed has been malfunction	*39*
Low pressure protection	*40*
High pressure protection	*41*
PFC module malfunction	*42*
Shutdown stop	*49*
Electrical disconnect	*50*
DR stop	*51*

2. Troubleshooting

2.1 Display board

Icon explanation on indoor display board (Console)



2.2 Indoor Unit Malfunctions

For the Console

Malfunction	Timer Lamp	Operation Lamp (flashes)
Indoor EEPROM malfunction	X	1
Communication malfunction between indoor and outdoor units	X	2
Indoor fan speed malfunction	X	4
T1 temperature sensor open or short circuit	X	5
T2 temperature sensor open or short circuit	X	6
Refrigerant leakage	X	7
Overcurrent protection (for some units)	O	1
T4 temperature sensor open or short circuit	O	2
T3 temperature sensor open or short circuit	O	3
T5 temperature sensor open or short circuit	O	4
Outdoor EEPROM malfunction (for some units)	O	5
Outdoor fan speed malfunction	O	6
IPM module malfunction	☆	1
DC voltage too high/too low protection	☆	2
Low ambient temperature protection	☆	4
Inverter compressor drive protection	☆	5
Compressor low pressure protection	☆	7
O (on) X(off) ☆(flash at 2Hz)		

For Other types (12K)

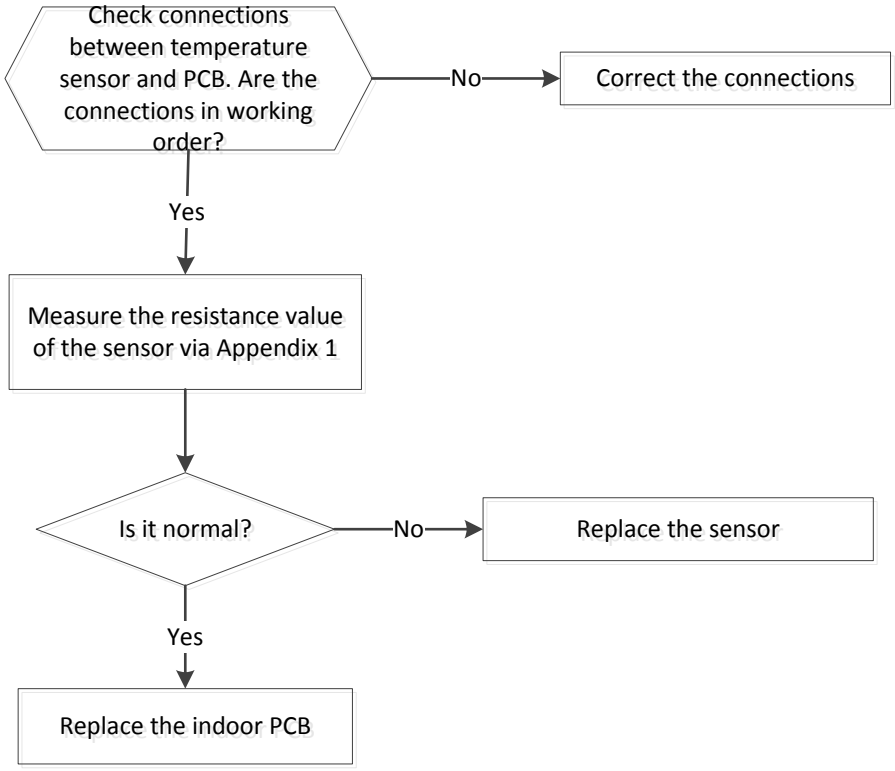
Malfunction	Error Code	Timer Lamp	Operation Lamp (flashes)
Indoor EEPROM malfunction	E0	X	1
Communication malfunction between indoor and outdoor units	E1	X	2
Indoor fan speed malfunction	E3	X	4
T1 temperature sensor open or short circuit	E4	X	5
T2 temperature sensor open or short circuit	E5	X	6
Refrigerant leakage detection	EC	X	7
Water level alarm	EE	X	8
Communication error between master and slave unit (for twins system)	E8	X	9
Another indoor unit malfunction (for twins system)	E9	X	10
Overcurrent protection (for some units)	F0	O	1
T4 temperature sensor open or short circuit	F1	O	2
T3 temperature sensor open or short circuit	F2	O	3
T5 temperature sensor open or short circuit	F3	O	4
Outdoor EEPROM malfunction (for some units)	F4	O	5
Outdoor fan speed malfunction	F5	O	6
T2B temperature open or short circuit	F6	O	7
Communication malfunction between indoor two chips(For A6 Duct)	FA	O	11
IPM module malfunction	P0	☆	1
DC voltage too high/too low protection	P1	☆	2
Low ambient temperature protection	P3	☆	4
Inverter compressor drive protection	P4	☆	5
Compressor low pressure protection	P6	☆	7
Outdoor IGBT sensor is faulty	P7	☆	8
O (on) X(off) ☆(flash at 2Hz)			

2.4 Resolving Typical Malfunctions

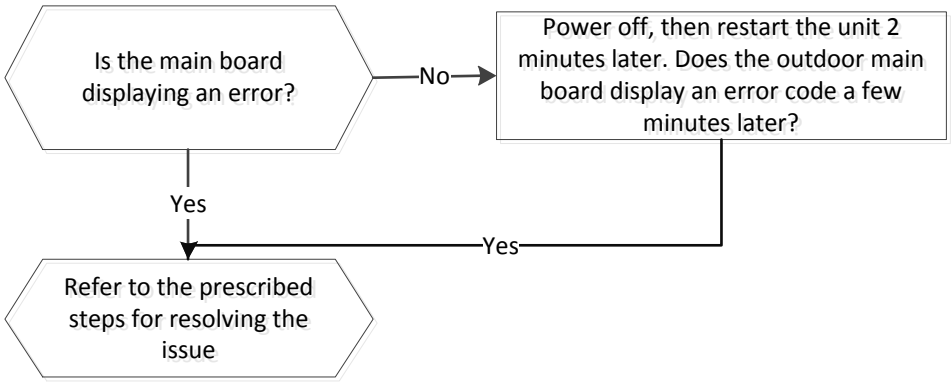
2.4.1 For Indoor Units

2.4.1.1 Temperature Sensor Open or Short Circuit

Malfunction conditions	If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED will display the failure.
Possible causes	● Wiring mistakes ● Faulty sensor ● Faulty PCB

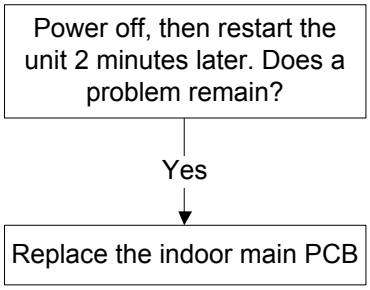


2.4.1.2. Outdoor Unit Malfunction



2.4.1.3. Indoor EEPROM Malfunction

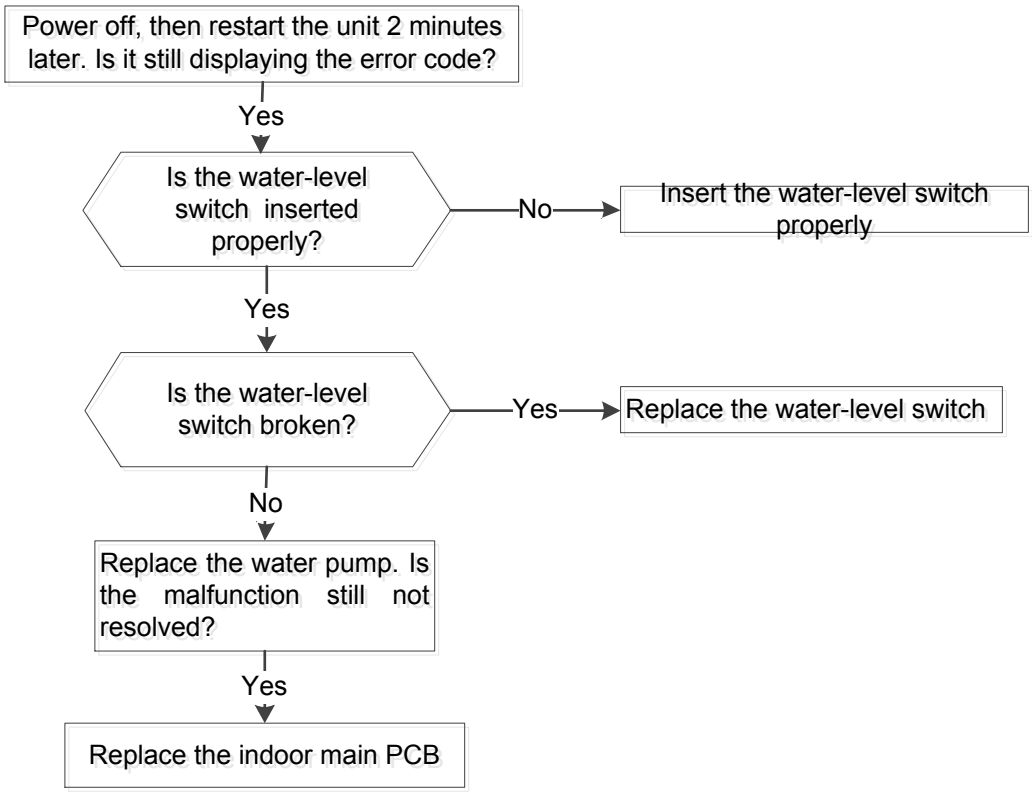
Malfunction conditions	Main PCB chip does not receive feedback from EEPROM chip
Possible causes	● Installation mistakes ● Faulty PCB



EEPROM: An electrically erasable programmable read-only memory whose contents can be erased and reprogrammed using a pulsed voltage.

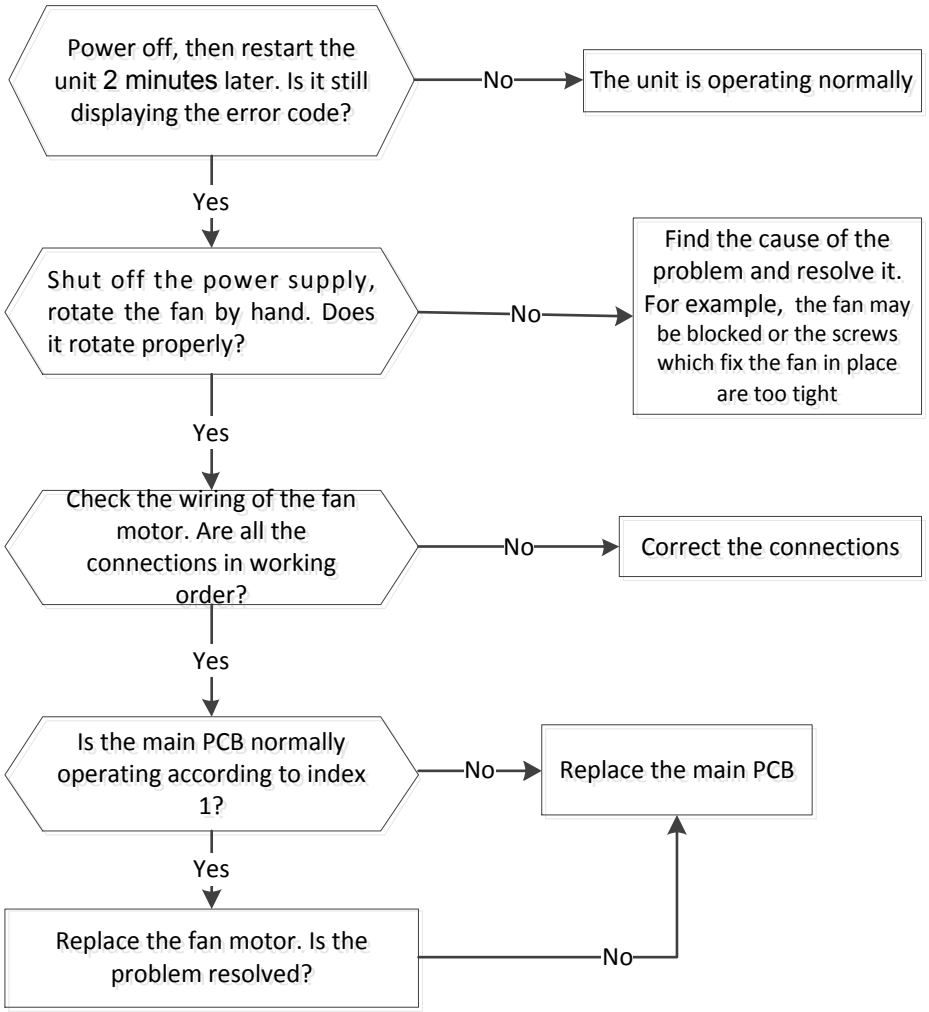
2.4.1.4. Water-Level Alarm Malfunction

Malfunction conditions	If the sampling voltage is not 5V, the LED will display the failure code.
Possible causes	● Wiring mistakes ● Faulty water-level switch ● Faulty water pump ● Faulty indoor PCB



2.4.1.5. Indoor Fan Speed Malfunction

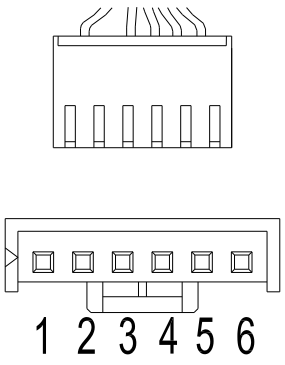
Malfunction conditions	When indoor fan speed continues to run at too low a speed (300RPM) for a certain period of time, the unit will stop and the LED will display a failure code.
Possible causes	● Wiring mistakes ● Faulty fan assembly ● Faulty fan motor ● Faulty PCB



Index 1:

1. Indoor DC fan motor (control chip is located inside the fan motor)

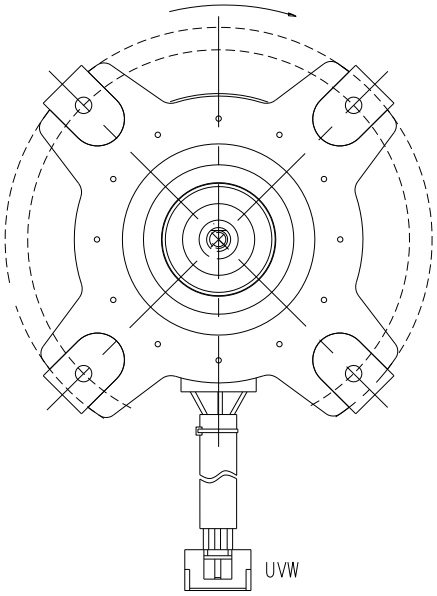
Power on and when the unit is on standby, measure the voltage of pin1-pin3, pin4-pin3 in the fan motor connector. If the value of the voltage is not within the range shown in the following table, the PCB may be experiencing problems and may need to be replaced.



DC motor voltage input and output

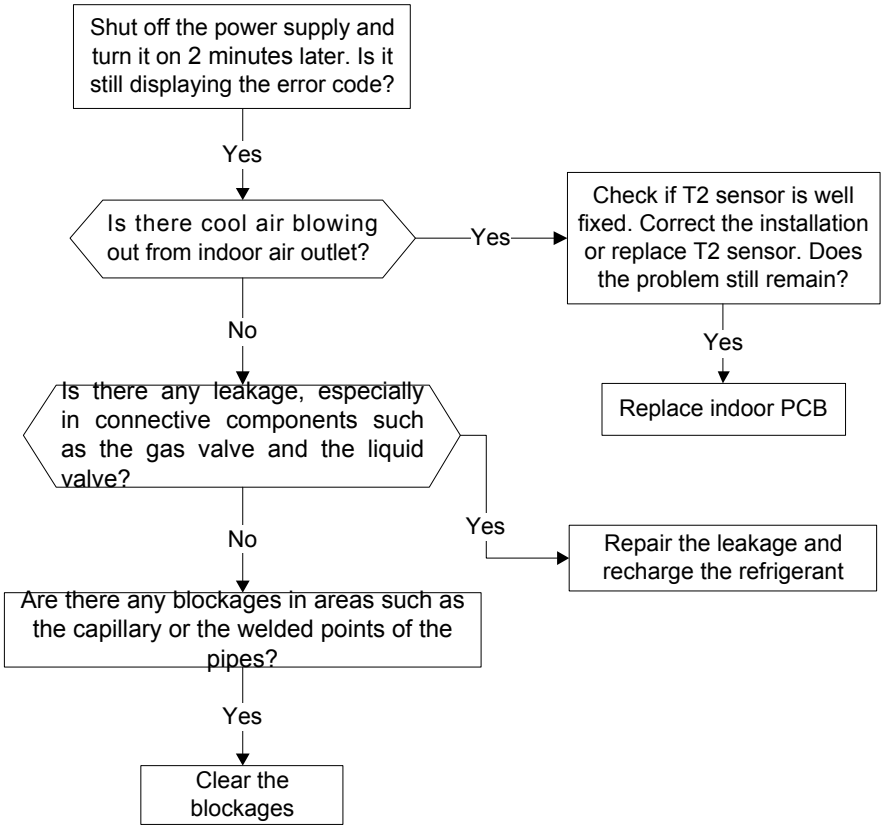
NO.	Color	Signal	Voltage
1	Red	Vs/Vm	200V~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	13.5-16.5V
5	Yellow	Vsp	0~6.5V
6	Blue	FG	13.5-16.5V

2. Indoor or outdoor DC Fan Motor (control chip is in PCB)
Release the UVW connector. Measure the resistance of U-V, U-W, and V-W. If the resistances are not equal to each other, the fan motor may be experiencing problems and need to be replaced. Otherwise, the PCB must has problems and need to be replaced.

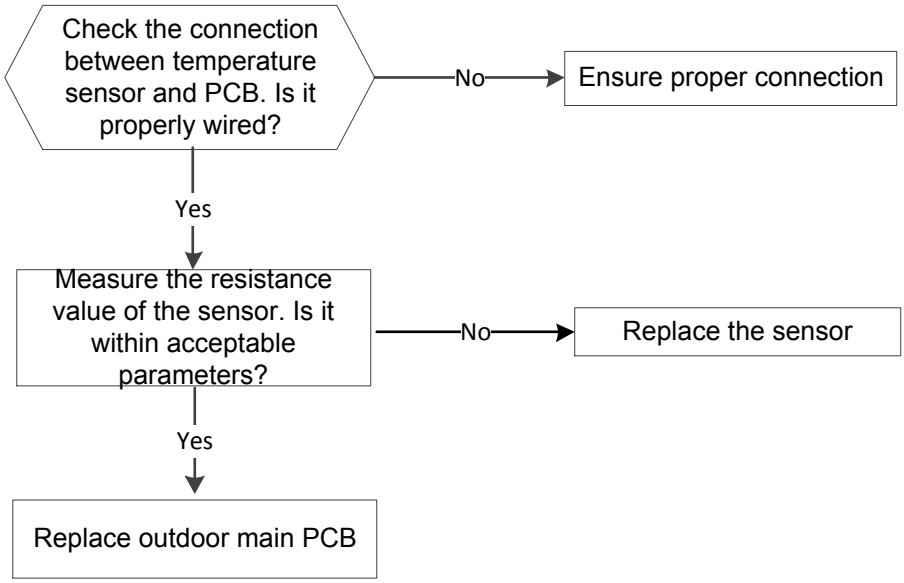


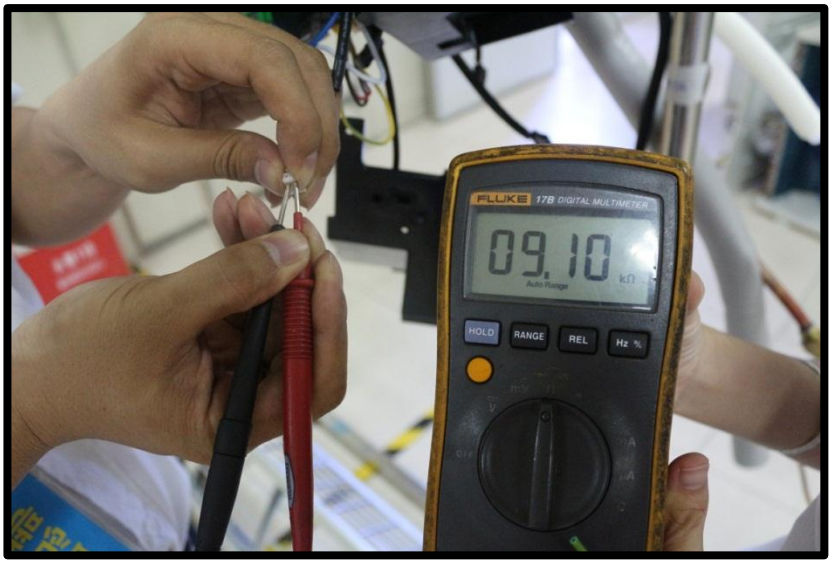
2.4.1.6. Refrigerant Leakage Detection

Malfunction conditions	**Define the evaporator coil temperature T2 of the compressor starts running as Tcool.** **If the following occurs 3 times, the display shows "EC" and the unit switches off:** **In the first 8 minutes after the compressor starts up, if T2 ＜Tcool－2℃ is not maintained for 4 seconds and compressor running frequency is not higher than 50Hz for 3 minutes**
Potential causes	● **T2 sensor error** ● **Indoor PCB error** ● **Refrigerant system error, such as leakage or blockages**



2.4.1.7 Outdoor IGBT sensor is faulty



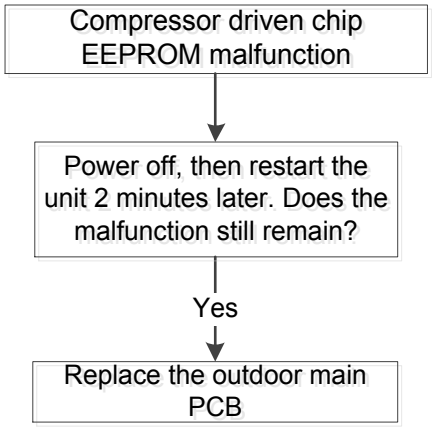


2.4.1.8 Communication malfunction between indoor and outdoor units
The same as E1 in outdoor.

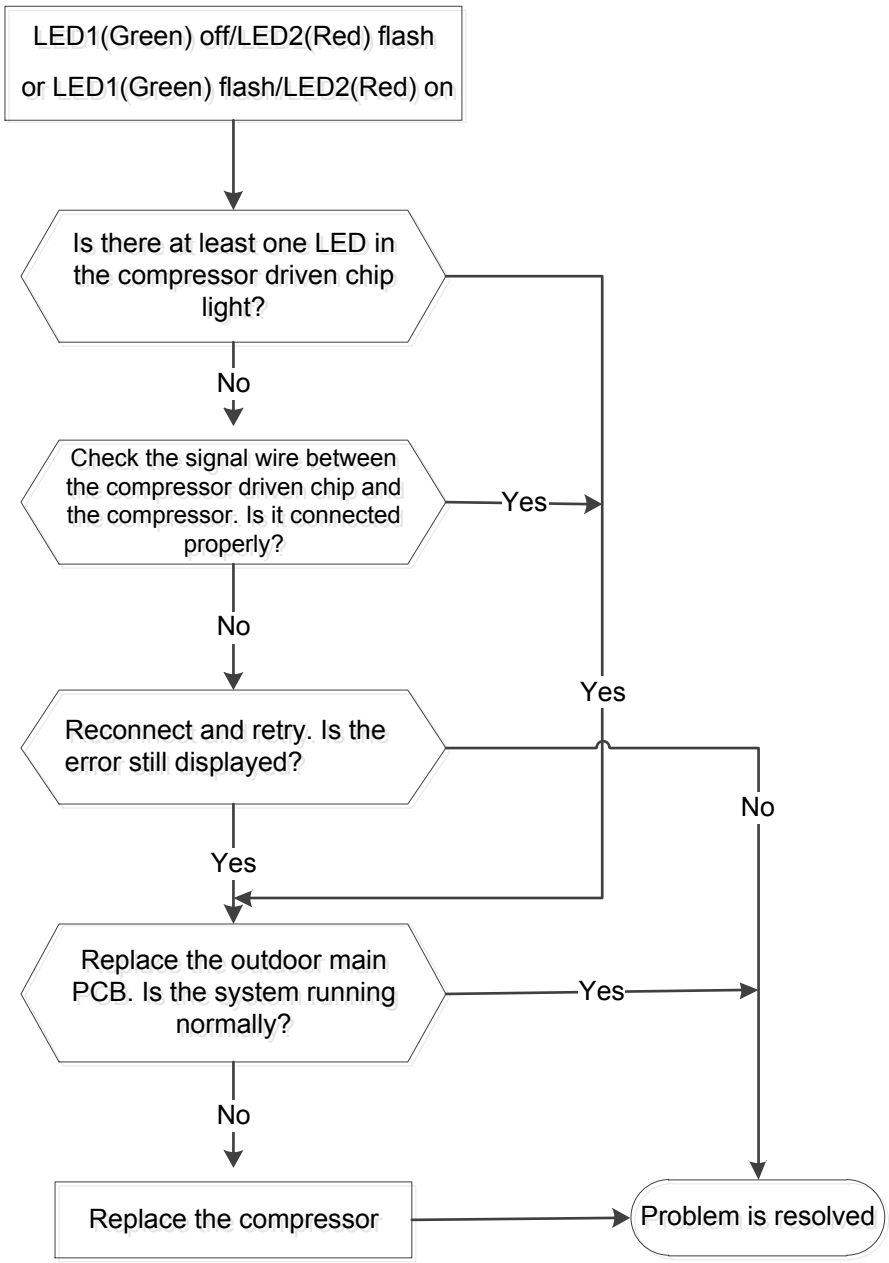
2.4.4 Outdoor Units

2.4.4.1. Compressor Driven Chip EEPROM Malfunction

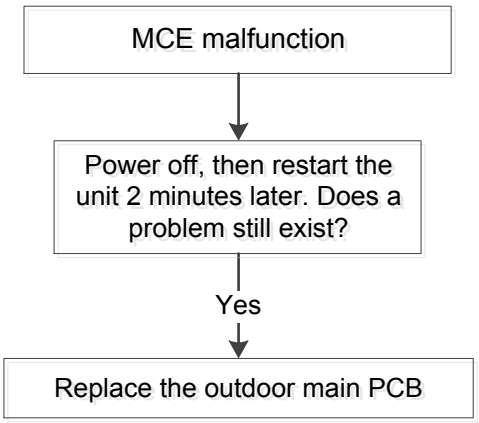
Malfunction conditions	Main PCB chip does not receive feedback from EEPROM chip
Possible causes	● Installation mistakes ● Faulty PCB



2.4.4.2 Compressor Speed Malfunction/ Zero Speed Protection / Synchronous Fault Protection

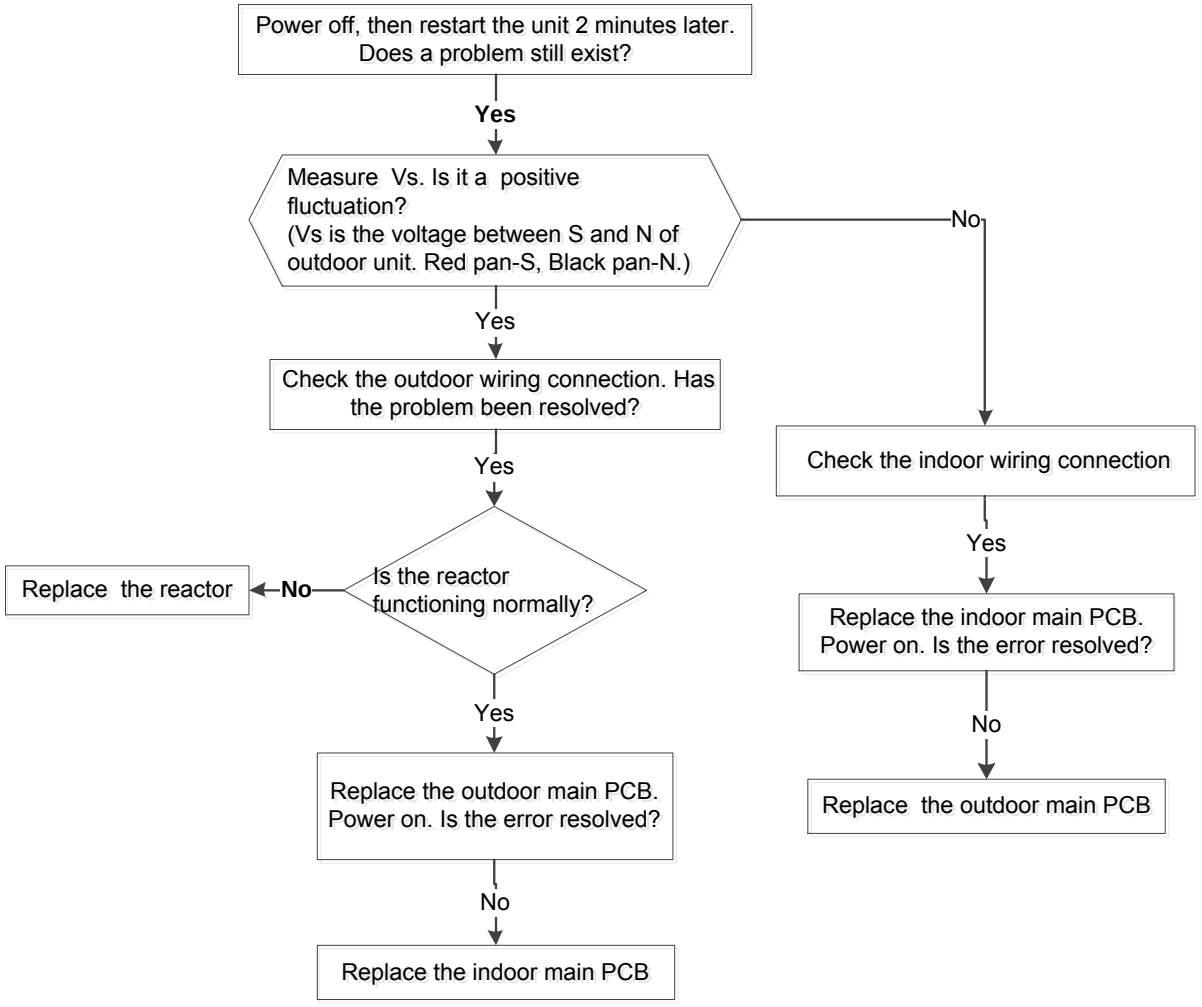


2.4.4.3 MCE Malfunction



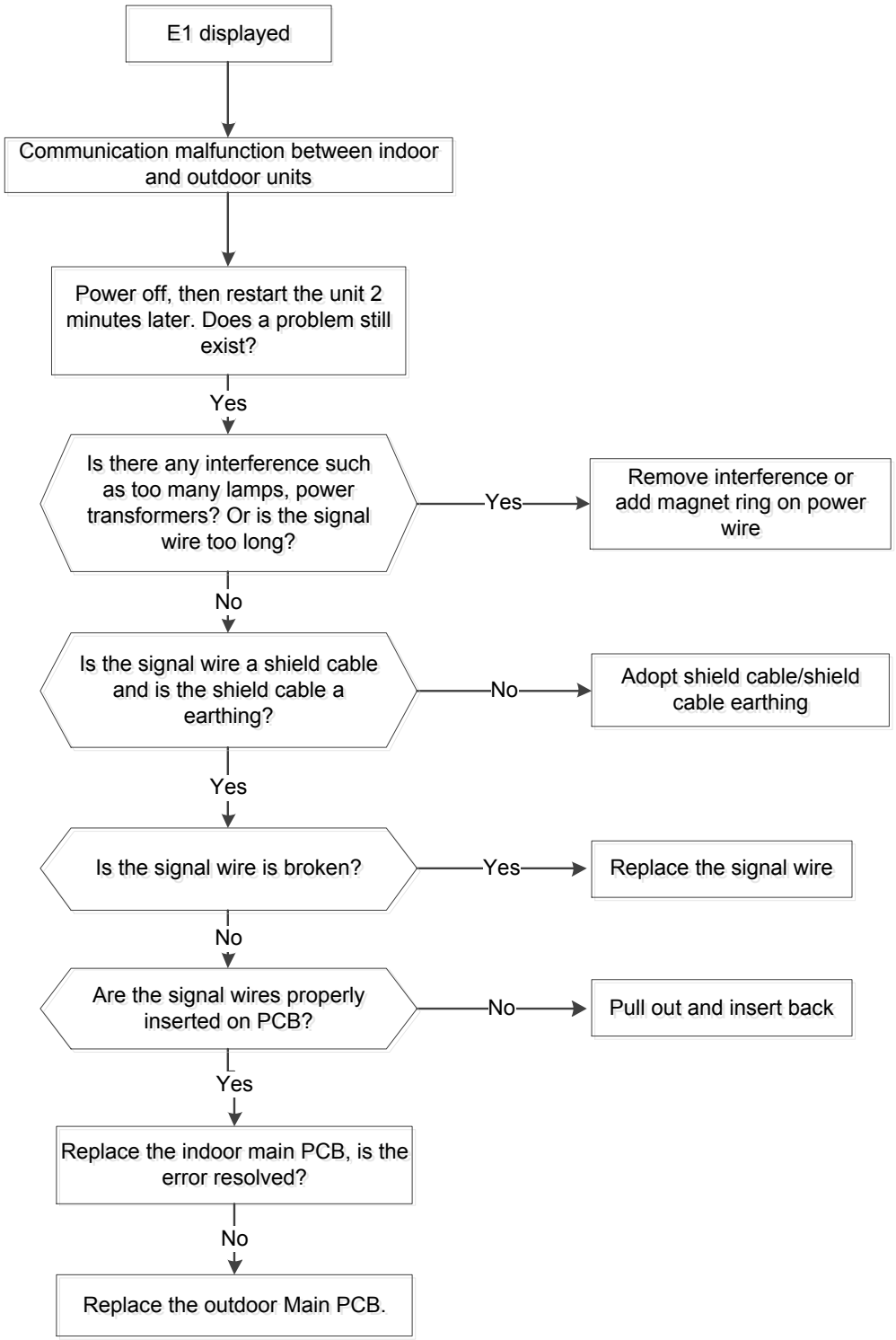
2.4.4.4. E1 malfunction
Current loop communication:

Malfunction conditions	**Indoor unit does not receive feedback from outdoor unit for 110 seconds. This occurs 4 times in a row.**
Possible causes	● Wiring mistakes ● Faulty indoor or outdoor PCB



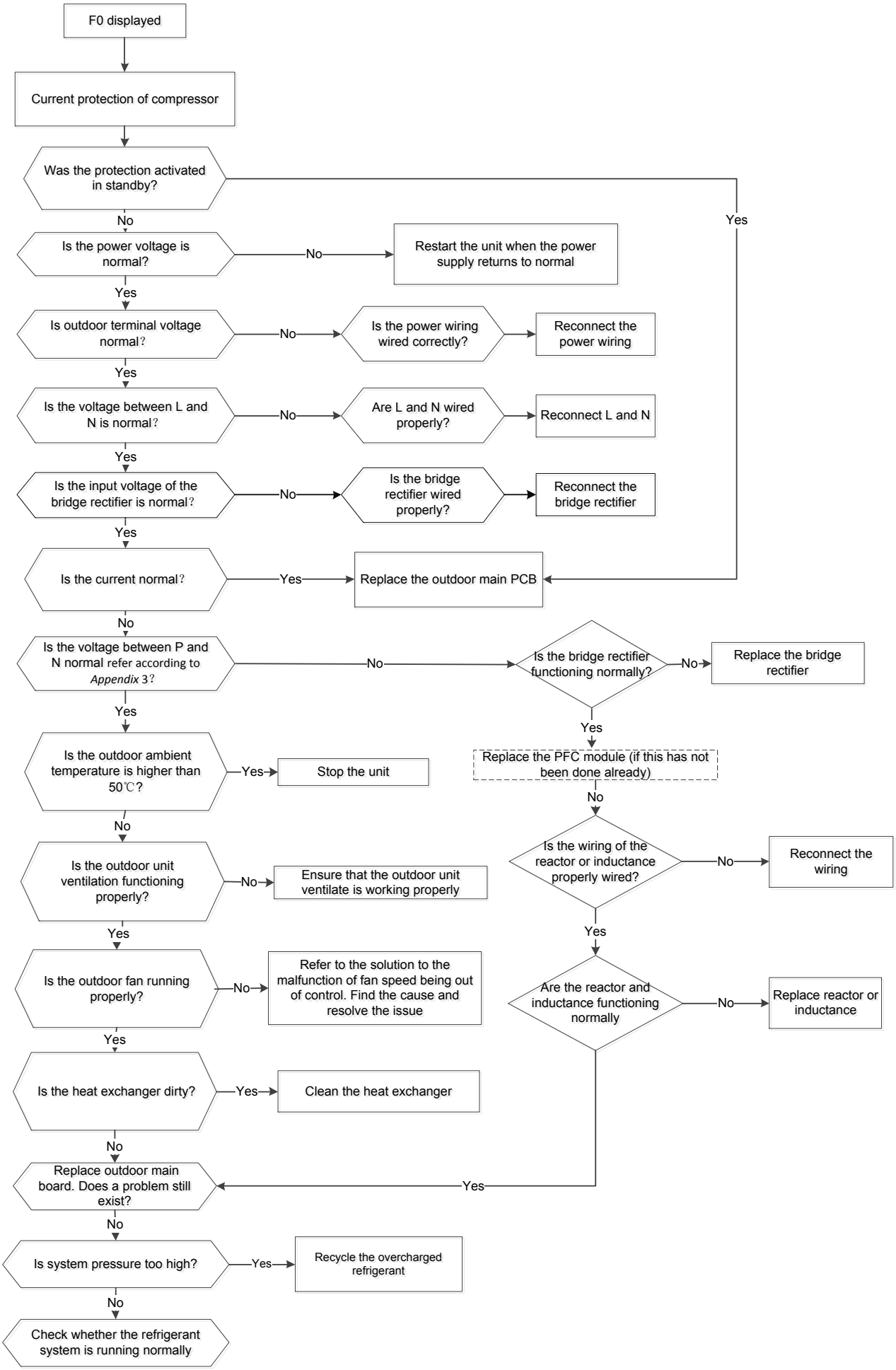
For 485 Communication

Malfunction conditions	Indoor unit does not receive feedback from outdoor unit for 60 seconds OR outdoor unit does not receive feedback from indoor unit for 120 seconds.
Possible causes	● Wiring mistakes ● Faulty indoor or outdoor PCB

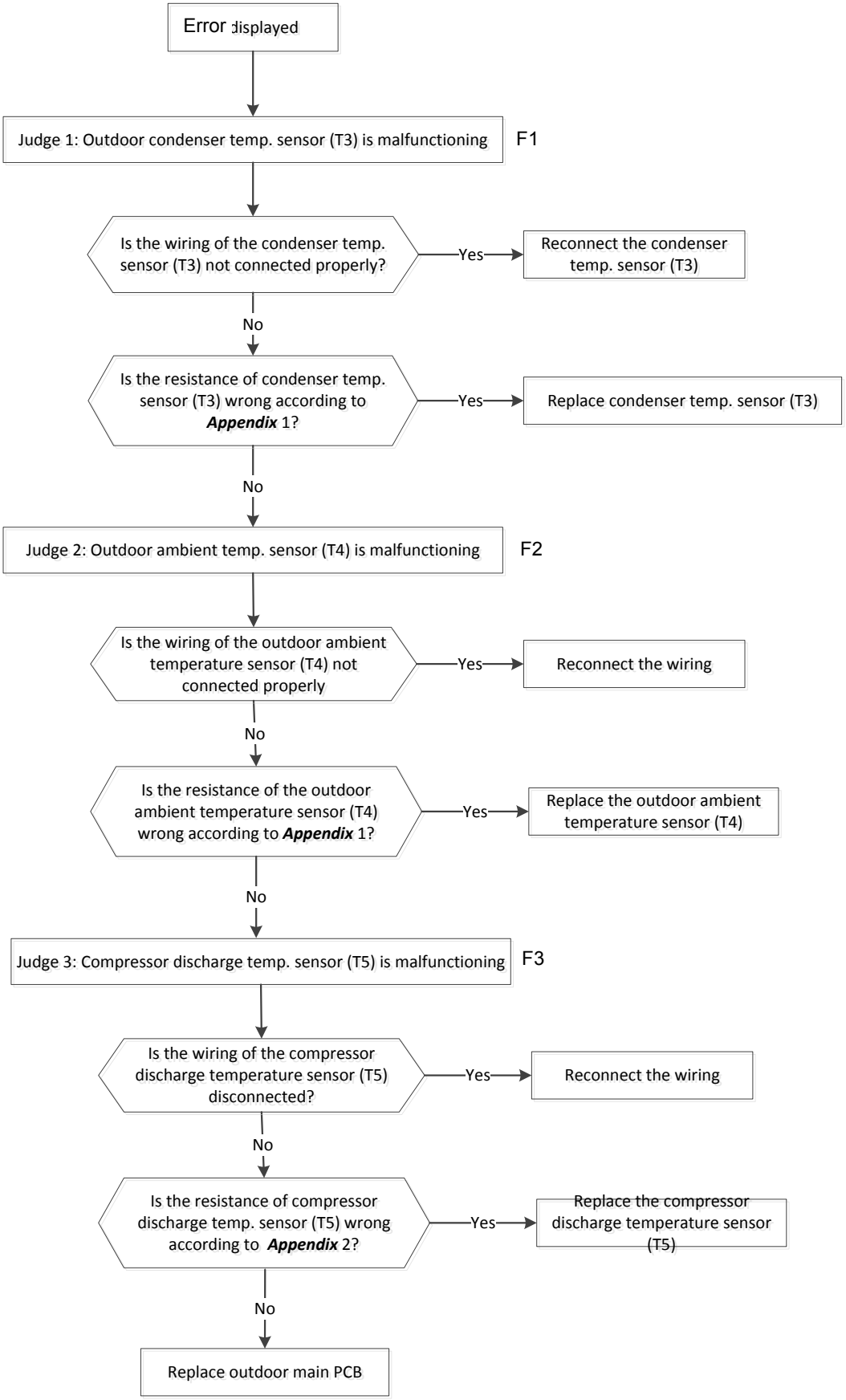


2.4.4.5. F0 Malfunction

Malfunction conditions	If the outdoor current exceeds the current limit value, the LED displays a failure code.
Possible causes	● Wiring mistakes ● Faulty bridge rectifier ● System blockages ● Faulty outdoor PCB

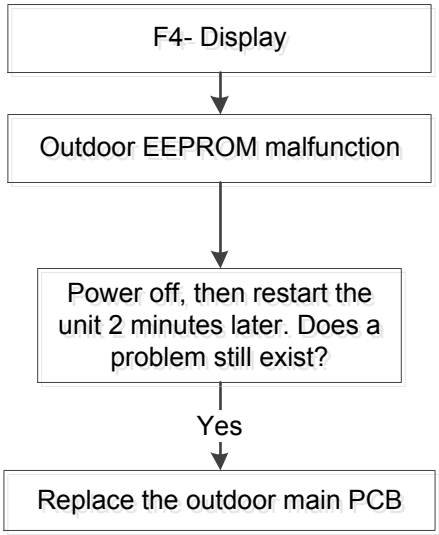

F0 displayed
Current protection of compressor
Was the protection activated in standby?
Yes
No
Is the power voltage is normal?
No
Restart the unit when the power supply returns to normal
Yes
Is outdoor terminal voltage normal?
No
Is the power wiring wired correctly?
Reconnect the power wiring
Yes
Is the voltage between L and N is normal?
No
Are L and N wired properly?
Reconnect L and N
Yes
Is the input voltage of the bridge rectifier is normal?
No
Is the bridge rectifier wired properly?
Reconnect the bridge rectifier
Yes
Is the current normal?
Yes
Replace the outdoor main PCB
No
Is the voltage between P and N normal refer according to Appendix 3?
No
Is the bridge rectifier functioning normally?
No
Replace the bridge rectifier
Yes
Replace the PFC module (if this has not been done already)
Yes
Is the outdoor ambient temperature is higher than 50℃?
Yes
Stop the unit
No
Is the outdoor unit ventilation functioning properly?
No
Ensure that the outdoor unit ventilate is working properly
No
Is the wiring of the reactor or inductance properly wired?
No
Reconnect the wiring
Yes
Yes
Is the outdoor fan running properly?
No
Refer to the solution to the malfunction of fan speed being out of control. Find the cause and resolve the issue
Are the reactor and inductance functioning normally
No
Replace reactor or inductance
Yes
Is the heat exchanger dirty?
Yes
Clean the heat exchanger
No
Replace outdoor main board. Does a problem still exist?
Yes
No
Is system pressure too high?
Yes
Recycle the overcharged refrigerant
No
Check whether the refrigerant system is running normally

2.4.4.6. F1, F2, F3 Malfunction



2.4.4.7. F4 Malfunction

Malfunction conditions	Main PCB chip does not receive feedback from EEPROM chip
Possible causes	● Installation mistakes ● Faulty PCB



EEPROM: An electrically erasable programmable read-only memory whose contents can be erased and reprogrammed using a pulsed voltage.

2.4.4.8. F5 Malfunction

The same as E3 in indoor unit.

2.4.4.9. P0 Malfunction

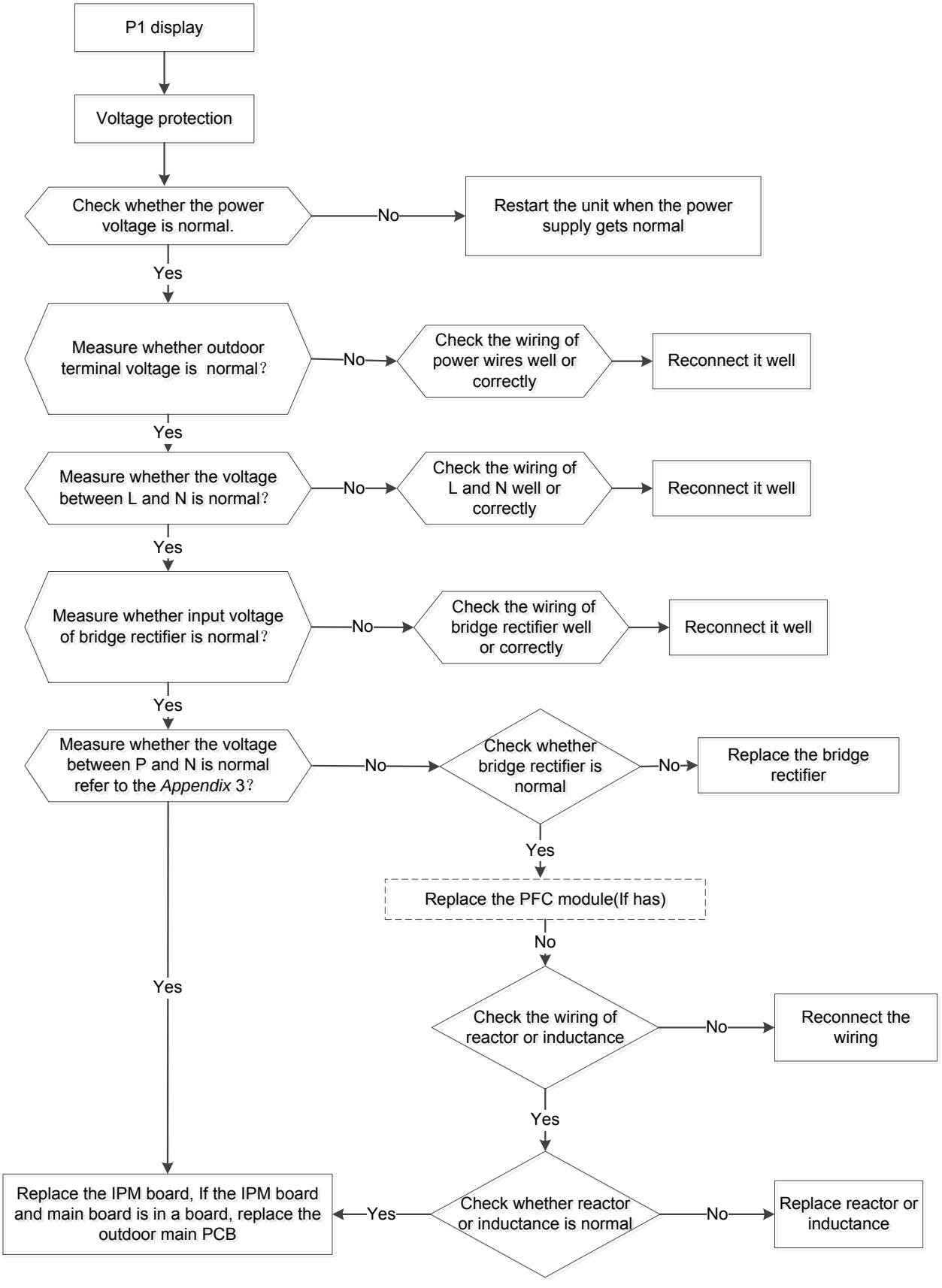
Malfunction conditions	When the voltage signal the IPM sends to compressor drive chip is not normal, the LED displays “P0” and the unit turns off.
Possible causes	● Wiring mistakes ● Faulty IPM board ● Faulty outdoor fan assembly ● Compressor malfunction ● Faulty outdoor PCB

First, test the resistance between every two ports of U, V, the W of the IPM and P, N. If any of the results is 0 or close to 0, the IPM is defective. If not, follow the following procedure:


P0 displayed
IPM module protection
No
Is the power voltage normal?
No
Restart the unit when the power supply returns to normal
Yes
Is the outdoor terminal voltage normal?
No
Are the power wires connected properly?
Reconnect the power wires
Yes
Is the voltage between L and N normal?
No
Are L and N wired correctly?
Reconnect L and N
Yes
Is the input voltage of bridge rectifier normal?
No
Is the bridge rectifier properly wired?
Reconnect the bridge rectifier
Yes
Is the voltage between P and N properly wired according to Appendix 3?
No
Is the bridge rectifier operating normally?
No
Replace the bridge rectifier
Yes
Yes
Is the connecting wire between the main board and the IPM board connected tightly?
No
Reconnect the main board and IPM board
Replace the PFC module(If This has not been done already)
No
Yes
Is the connecting wire of the compressor is connected correctly or tightly
No
Reconnect he connecting wire of the compressor
Are the reactor or Inductance wired properly?
No
Reconnect the wiring
Yes
Yes
Is the outdoor unit ventilation in working order?
No
Make sure that the outdoor unit is ventilating properly
Yes
Are the reactor or inductance normal?
No
Replace reactor or inductance
Yes
Is the outdoor fan running properly?
No
Refer to the solution for themalfunction of the fan speed being out of control . Find the cause and resolve the problem
Yes
Replace IPM Board. Is the problem resolved?
Yes
No
Replace the outdoor main PCB. Is the problem resolved?
No
Is the compress is running normally?
No
Replace the compressor
Yes
Check whether the refrigerant system is in working order

2.4.4.10. P1 malfunction

Malfunction decision conditions	An abnormal voltage rise or drop is detected by checking the specified voltage detection circuit.
Supposed causes	● Abnormal power supply ● Wiring mistake ● Faulty bridge rectifier ● Faulty IPM board

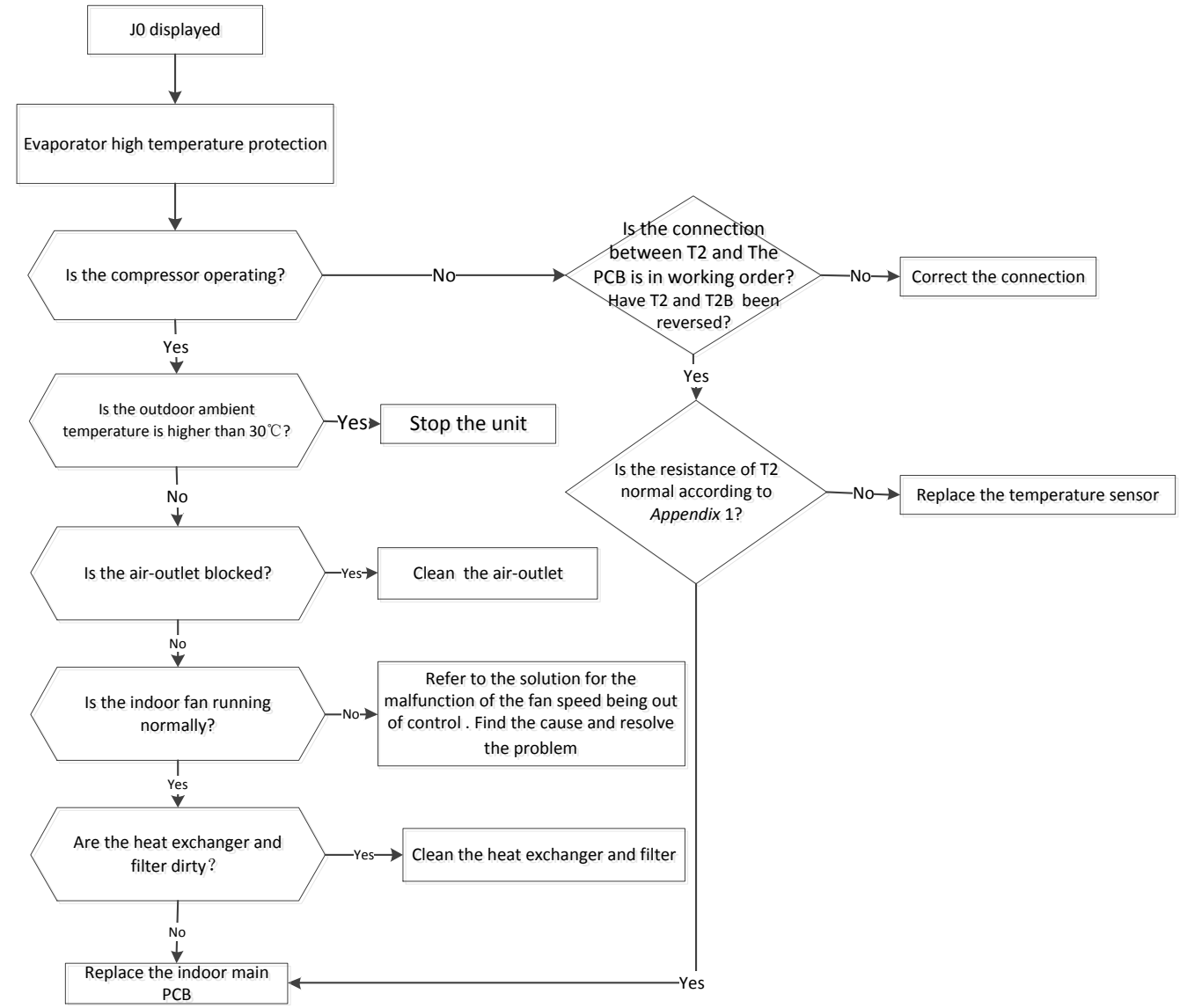


2.4.4.11. P4 Malfunction

The troubleshooting is same as the "IPM module protection"

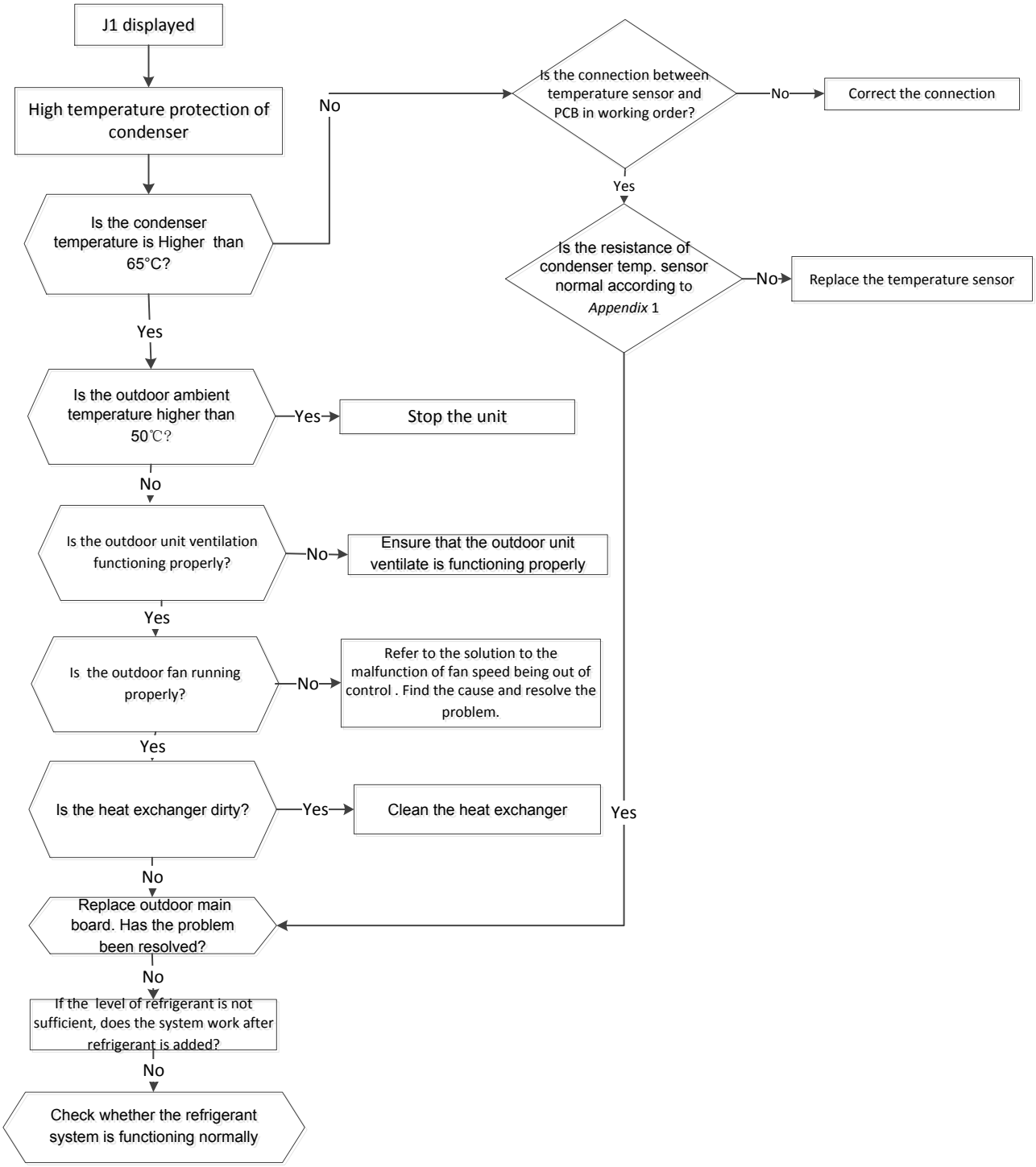
2.4.4.12. J0 Malfunction

Malfunction conditions	When evaporator coil temperature is more than 60°C, the unit stops. It starts again only when the evaporator coil temperature is less than 54°C
Possible causes	• Faulty evaporator coil temperature sensor • Dirty heat exchanger • Faulty fan • Faulty PCB



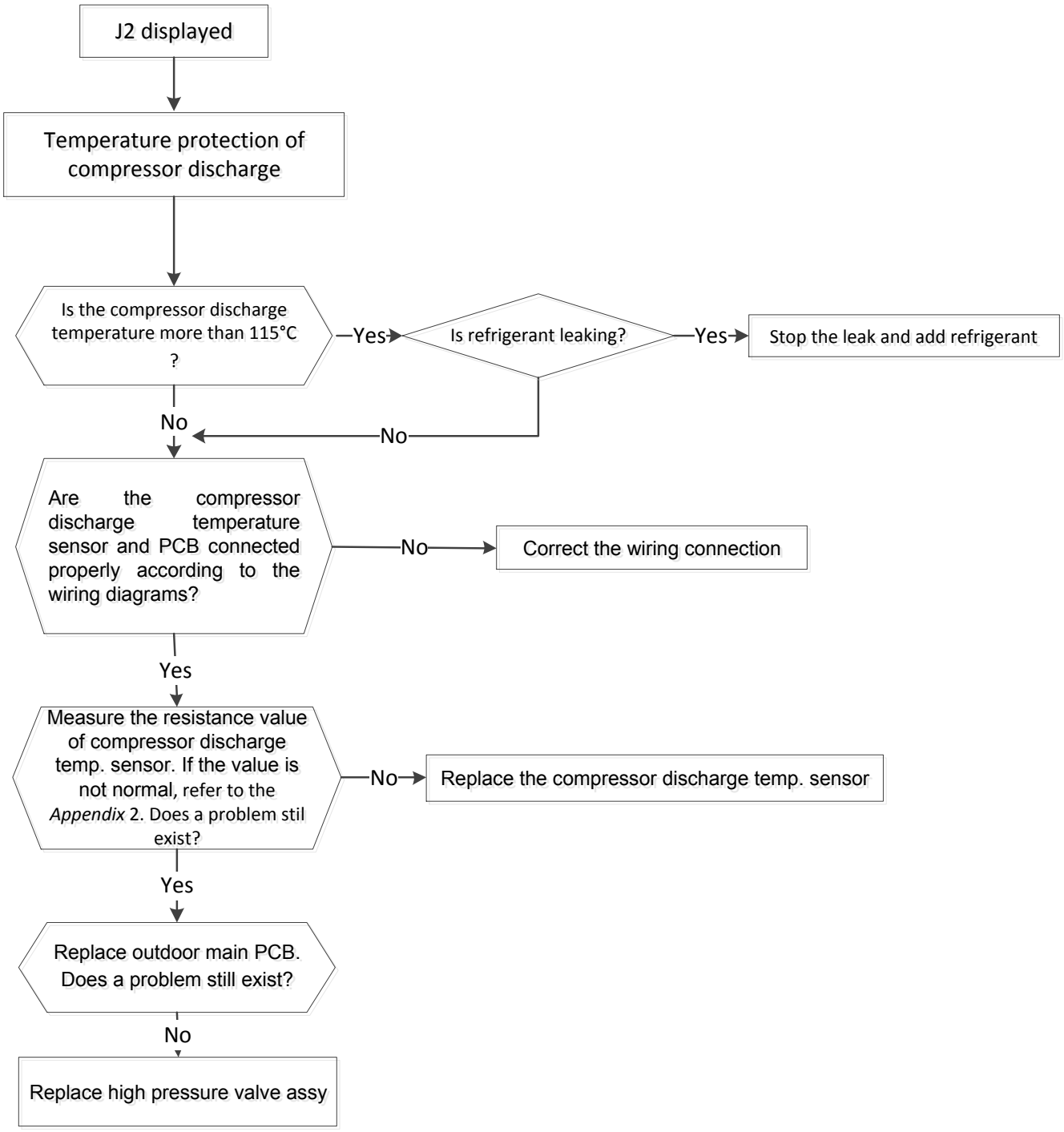
2.4.4.13. J1 Malfunction

Malfunction conditions	When the outdoor pipe temperature is more than 65°C, the unit stops. It starts again only when the outdoor pipe temperature is less than 52°C.
Possible causes	● Faulty condenser temperature sensor ● Dirty heat exchanger ● System leakage or blockages



2.4.4.14. J2 Malfunction

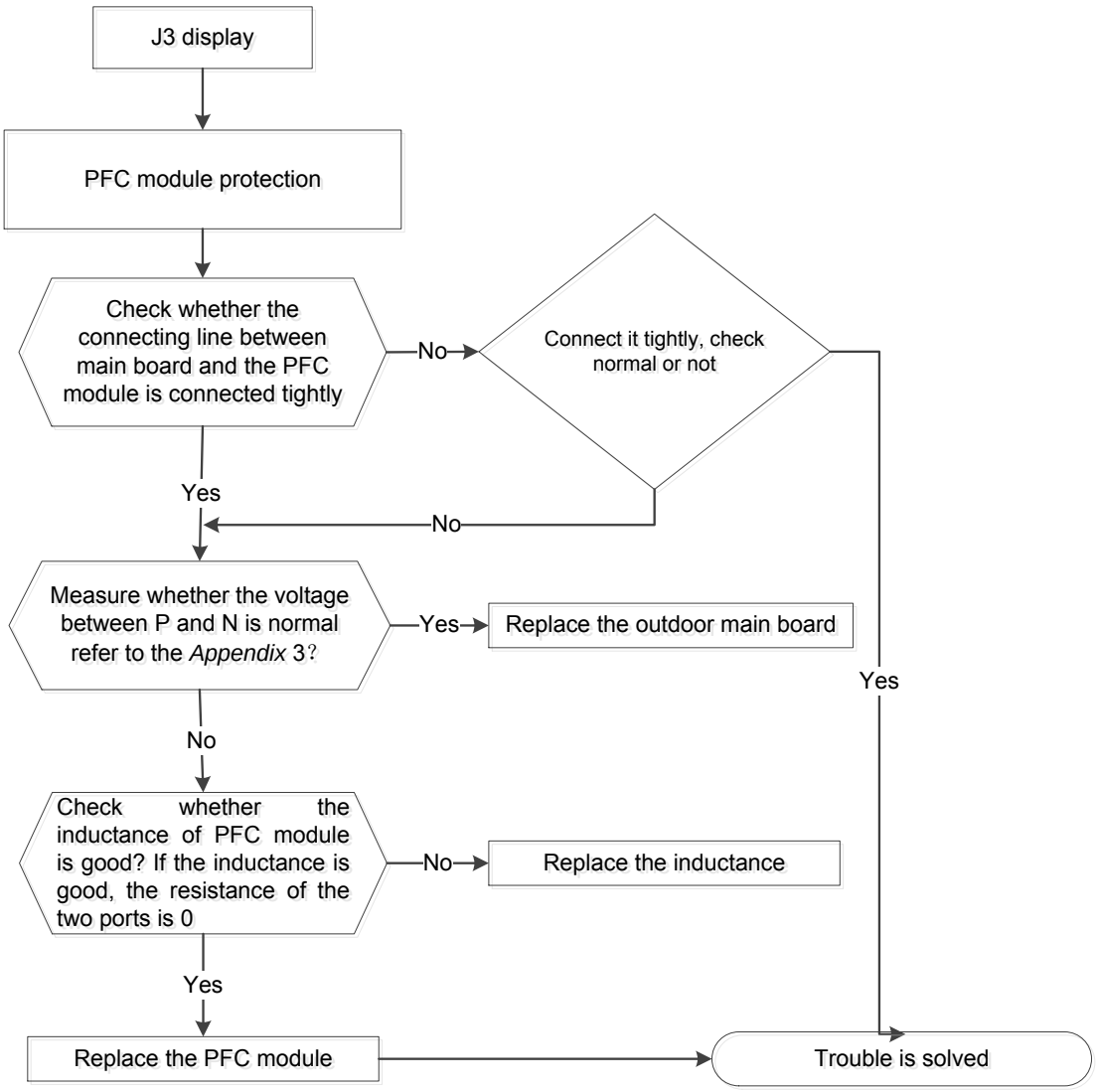
Malfunction conditions	When the compressor discharge temperature (T5) is more than 115℃ for 10 seconds, the compressor will stop and not restart until T5 is less than 90℃.
Possible causes	● Refrigerant leakage ● Wiring mistake ● Faulty discharge temperature sensor ● Faulty outdoor PCB



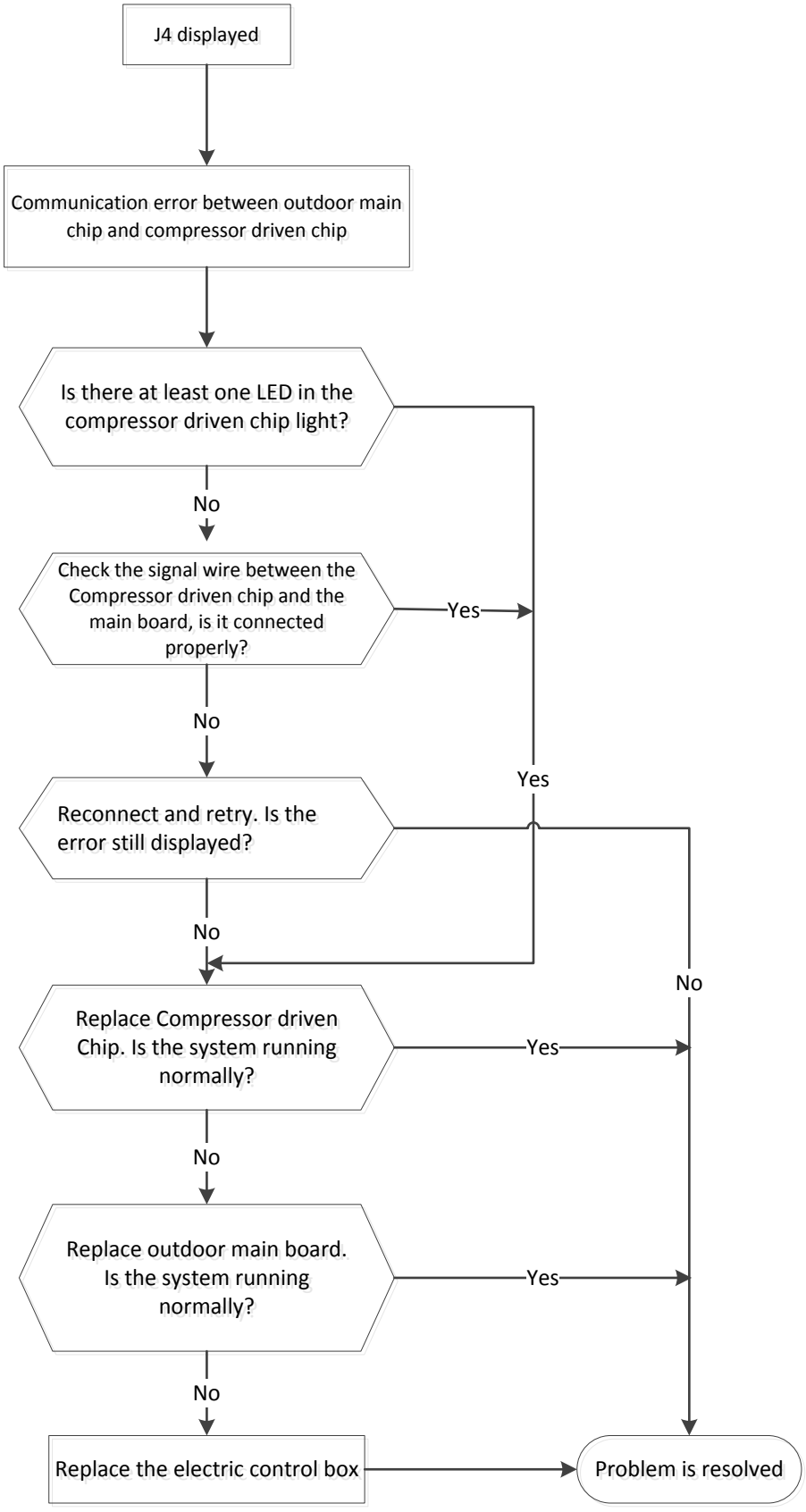
2.4.4.15. J3 Malfunction

Malfunction decision conditions	When the voltage signal that IPM send to compressor drive chip is abnormal, the display LED will show “J3” and AC will turn off.
Supposed causes	● Wiring mistake ● Faulty IPM board ● Faulty outdoor fan assembly ● Compressor malfunction ● Faulty outdoor PCB

At first test the resistance between every two ports of U, V, W of IPM and P, N. If any result of them is 0 or close to 0, the IPM is defective. Otherwise, please follow the procedure below:

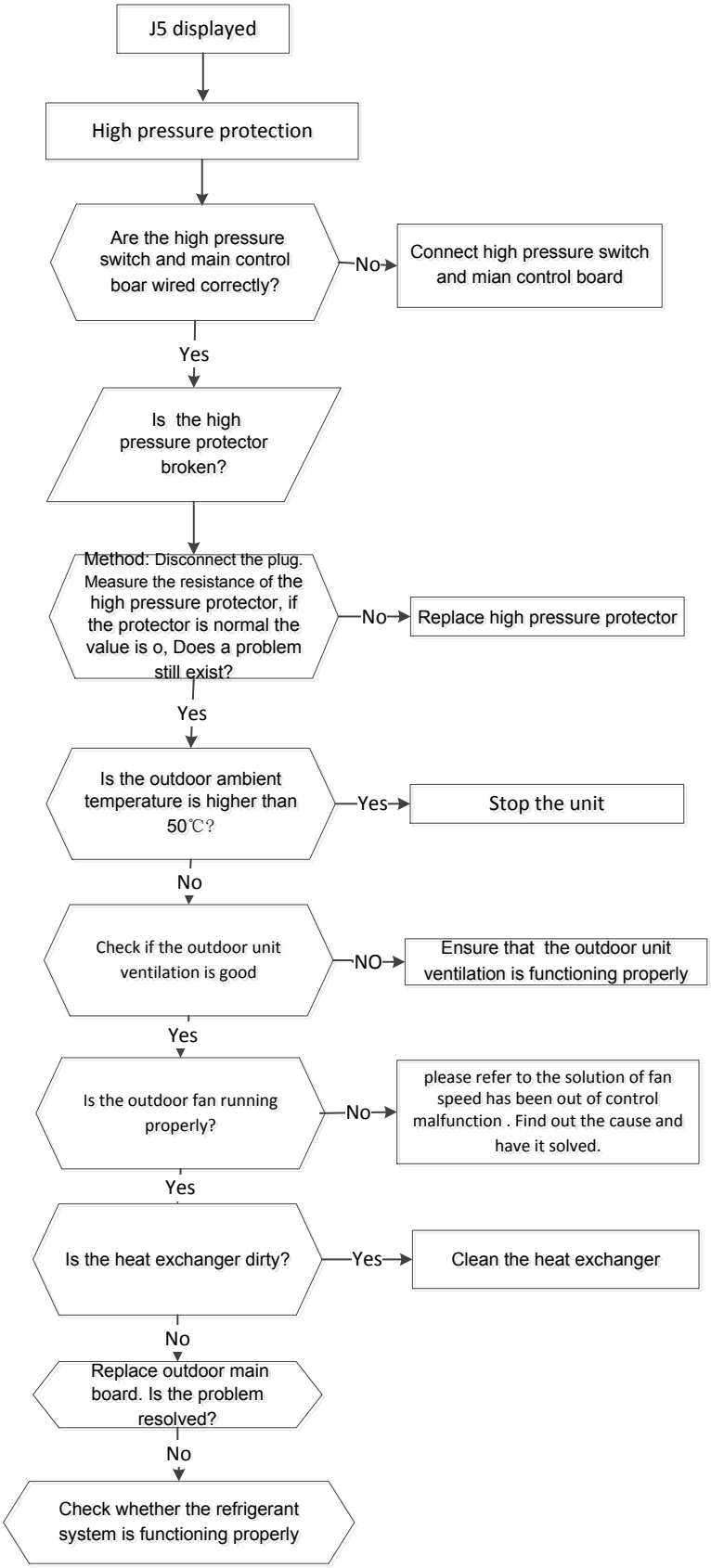


2.4.4.16. J4 Malfunction



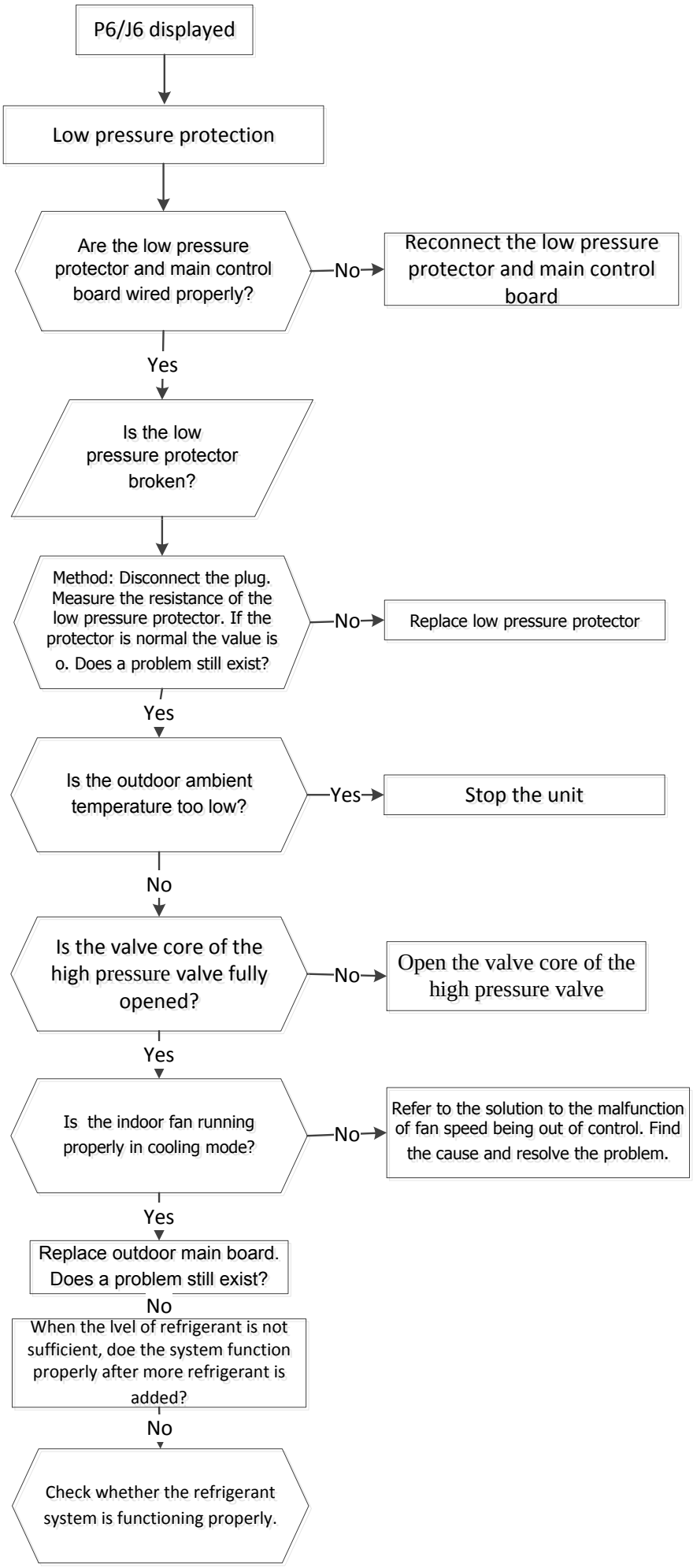
2.4.4.17. J5 Malfunction

Malfunction conditions	If the sampling voltage is not 5V, the LED displays a failure code.
Possible causes	● Wiring mistakes ● Faulty overload protector ● System blockages ● Faulty outdoor PCB



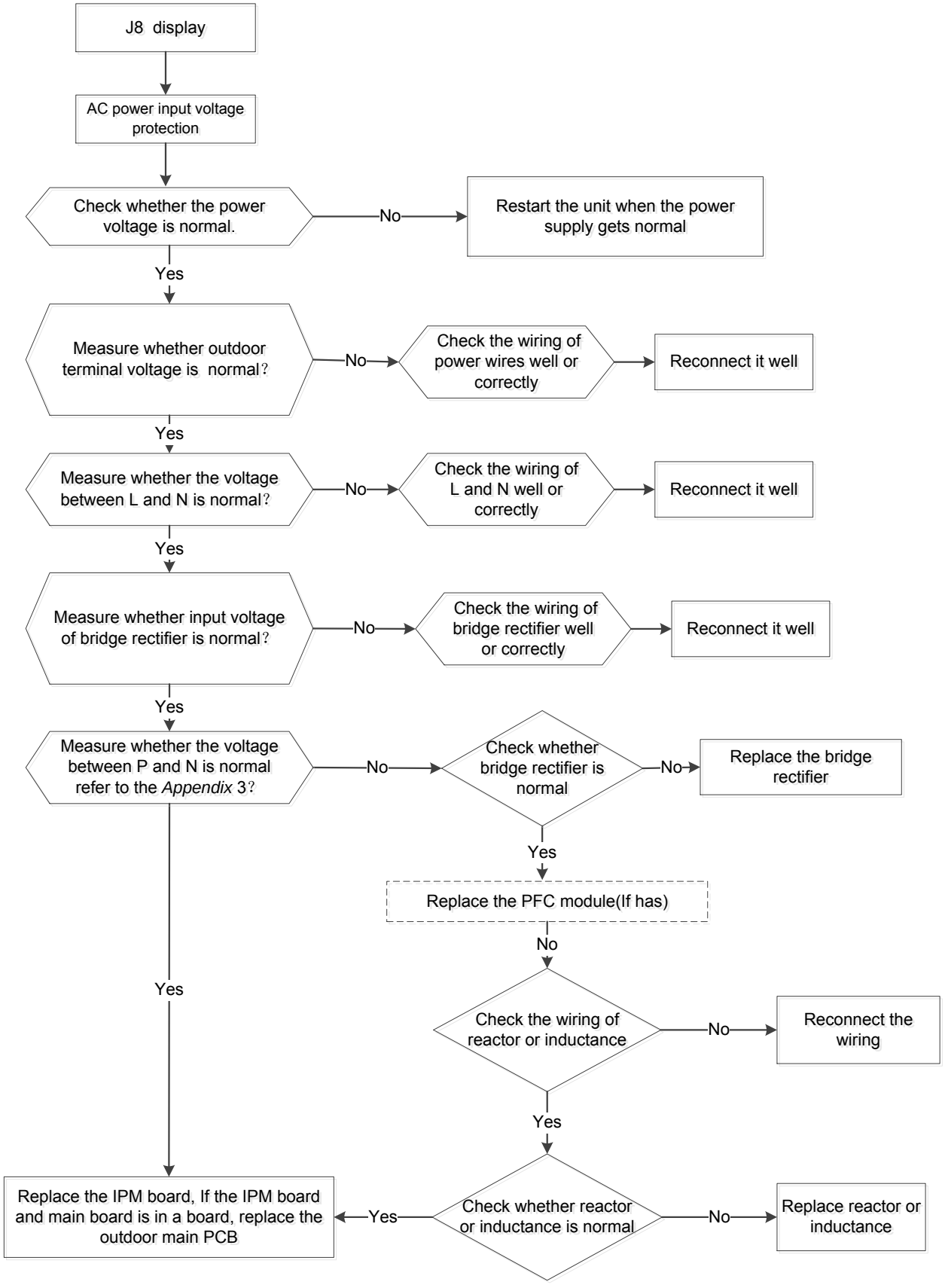
2.4.4.18. P6/J6 Malfunction

Malfunction conditions	If the sampling voltage is not 5V, the LED displays a failure code.
Possible causes	● Wiring mistake ● Faulty over load protector ● System blockages ● Faulty outdoor PCB


P6/J6 displayed
Low pressure protection
Are the low pressure protector and main control board wired properly?
No
Reconnect the low pressure protector and main control board
Yes
Is the low pressure protector broken?
Method: Disconnect the plug. Measure the resistance of the low pressure protector. If the protector is normal the value is o. Does a problem still exist?
No
Replace low pressure protector
Yes
Is the outdoor ambient temperature too low?
Yes
Stop the unit
No
Is the valve core of the high pressure valve fully opened?
No
Open the valve core of the high pressure valve
Yes
Is the indoor fan running properly in cooling mode?
No
Refer to the solution to the malfunction of fan speed being out of control. Find the cause and resolve the problem.
Yes
Replace outdoor main board. Does a problem still exist?
No
When the lvel of refrigerant is not sufficient, doe the system function properly after more refrigerant is added?
No
Check whether the refrigerant system is functioning properly.

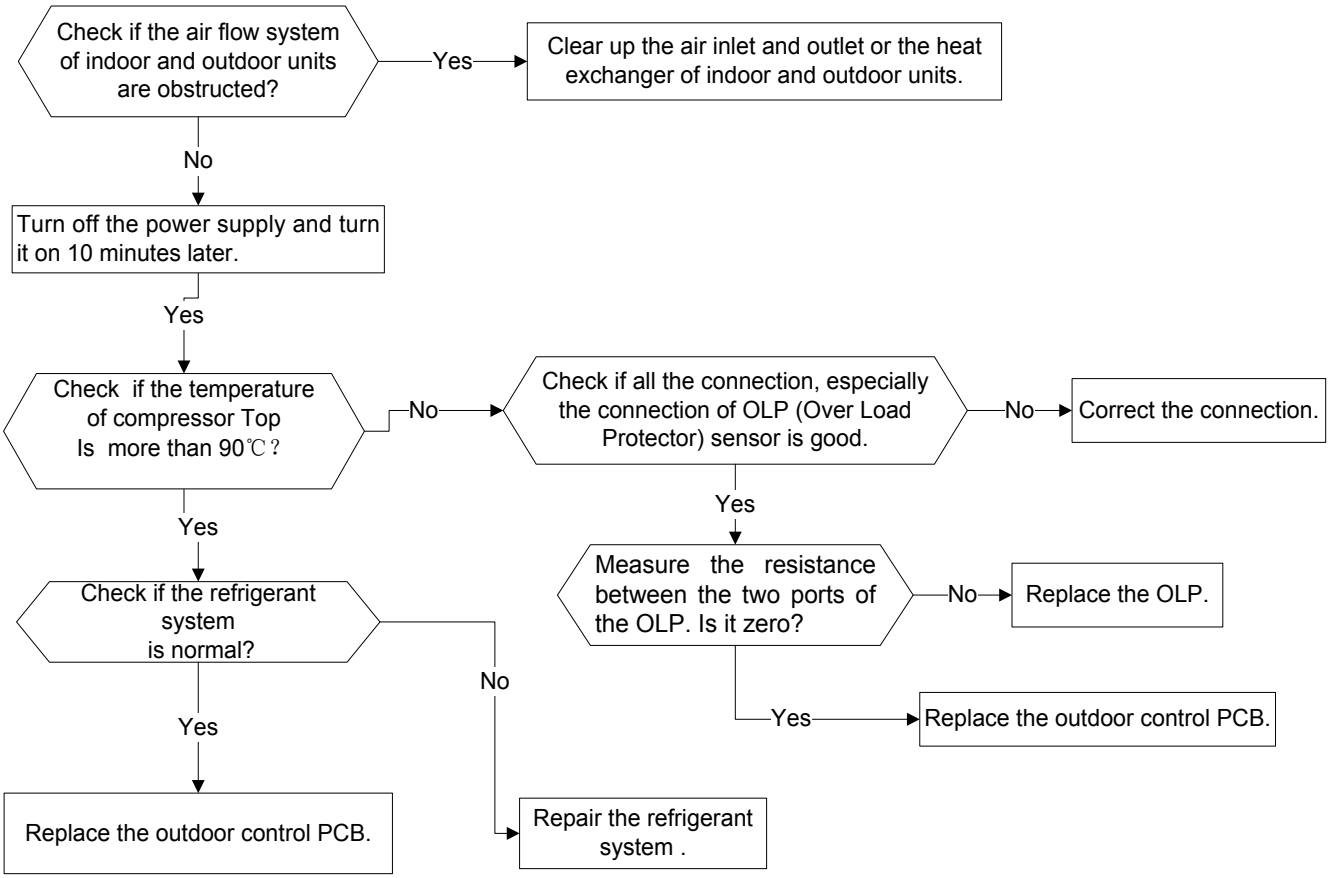
2.4.4.19. J8 malfunction

Malfunction decision conditions	An abnormal voltage rise or drop is detected by checking the specified voltage detection circuit.
Supposed causes	● Abnormal power supply ● Wiring mistake ● Faulty bridge rectifier ● Faulty IPM board



2.4.4.20. P2 malfunction

Malfunction decision conditions	**If the sampling voltage is not 5V, the LED will display the failure.**
Supposed causes	● Faulty overload protector ● Wiring mistake ● System leakage or block ● Faulty PCB



Appendix 1 Temperature Sensor Resistance Value Table (℃--K)

℃	K Ohm	℃	K Ohm	℃	K Ohm	℃	K Ohm
-20	115.266	20	12.6431	60	2.35774	100	0.62973
-19	108.146	21	12.0561	61	2.27249	101	0.61148
-18	101.517	22	11.5000	62	2.19073	102	0.59386
-17	96.3423	23	10.9731	63	2.11241	103	0.57683
-16	89.5865	24	10.4736	64	2.03732	104	0.56038
-15	84.2190	25	10.000	65	1.96532	105	0.54448
-14	79.3110	26	9.55074	66	1.89627	106	0.52912
-13	74.5360	27	9.12445	67	1.83003	107	0.51426
-12	70.1698	28	8.71983	68	1.76647	108	0.49989
-11	66.0898	29	8.33566	69	1.70547	109	0.48600
-10	62.2756	30	7.97078	70	1.64691	110	0.47256
-9	58.7079	31	7.62411	71	1.59068	111	0.45957
-8	56.3694	32	7.29464	72	1.53668	112	0.44699
-7	52.2438	33	6.98142	73	1.48481	113	0.43482
-6	49.3161	34	6.68355	74	1.43498	114	0.42304
-5	46.5725	35	6.40021	75	1.38703	115	0.41164
-4	44.0000	36	6.13059	76	1.34105	116	0.40060
-3	41.5878	37	5.87359	77	1.29078	117	0.38991
-2	39.8239	38	5.62961	78	1.25423	118	0.37956
-1	37.1988	39	5.39689	79	1.21330	119	0.36954
0	35.2024	40	5.17519	80	1.17393	120	0.35982
1	33.3269	41	4.96392	81	1.13604	121	0.35042
2	31.5635	42	4.76253	82	1.09958	122	0.3413
3	29.9058	43	4.57050	83	1.06448	123	0.33246
4	28.3459	44	4.38736	84	1.03069	124	0.32390
5	26.8778	45	4.21263	85	0.99815	125	0.31559
6	25.4954	46	4.04589	86	0.96681	126	0.30754
7	24.1932	47	3.88673	87	0.93662	127	0.29974
8	22.5662	48	3.73476	88	0.90753	128	0.29216
9	21.8094	49	3.58962	89	0.87950	129	0.28482
10	20.7184	50	3.45097	90	0.85248	130	0.27770
11	19.6891	51	3.31847	91	0.82643	131	0.27078
12	18.7177	52	3.19183	92	0.80132	132	0.26408
13	17.8005	53	3.07075	93	0.77709	133	0.25757
14	16.9341	54	2.95896	94	0.75373	134	0.25125
15	16.1156	55	2.84421	95	0.73119	135	0.24512
16	15.3418	56	2.73823	96	0.70944	136	0.23916
17	14.6181	57	2.63682	97	0.68844	137	0.23338
18	13.9180	58	2.53973	98	0.66818	138	0.22776
19	13.2631	59	2.44677	99	0.64862	139	0.22231

Appendix 2

Unit: ℃---K			Discharge temperature sensor table				
-20	542.7	20	68.66	60	13.59	100	3.702
-19	511.9	21	65.62	61	13.11	101	3.595
-18	483	22	62.73	62	12.65	102	3.492
-17	455.9	23	59.98	63	12.21	103	3.392
-16	430.5	24	57.37	64	11.79	104	3.296
-15	406.7	25	54.89	65	11.38	105	3.203
-14	384.3	26	52.53	66	10.99	106	3.113
-13	363.3	27	50.28	67	10.61	107	3.025
-12	343.6	28	48.14	68	10.25	108	2.941
-11	325.1	29	46.11	69	9.902	109	2.86
-10	307.7	30	44.17	70	9.569	110	2.781
-9	291.3	31	42.33	71	9.248	111	2.704
-8	275.9	32	40.57	72	8.94	112	2.63
-7	261.4	33	38.89	73	8.643	113	2.559
-6	247.8	34	37.3	74	8.358	114	2.489
-5	234.9	35	35.78	75	8.084	115	2.422
-4	222.8	36	34.32	76	7.82	116	2.357
-3	211.4	37	32.94	77	7.566	117	2.294
-2	200.7	38	31.62	78	7.321	118	2.233
-1	190.5	39	30.36	79	7.086	119	2.174
0	180.9	40	29.15	80	6.859	120	2.117
1	171.9	41	28	81	6.641	121	2.061
2	163.3	42	26.9	82	6.43	122	2.007
3	155.2	43	25.86	83	6.228	123	1.955
4	147.6	44	24.85	84	6.033	124	1.905
5	140.4	45	23.89	85	5.844	125	1.856
6	133.5	46	22.89	86	5.663	126	1.808
7	127.1	47	22.1	87	5.488	127	1.762
8	121	48	21.26	88	5.32	128	1.717
9	115.2	49	20.46	89	5.157	129	1.674
10	109.8	50	19.69	90	5	130	1.632
11	104.6	51	18.96	91	4.849		
12	99.69	52	18.26	92	4.703		
13	95.05	53	17.58	93	4.562		
14	90.66	54	16.94	94	4.426		
15	86.49	55	16.32	95	4.294	B(25/50)=3950K	
16	82.54	56	15.73	96	4.167		
17	78.79	57	15.16	97	4.045	R(90℃)=5KΩ±3%	
18	75.24	58	14.62	98	3.927		
19	71.86	59	14.09	99	3.812		

Appendix 3

Normal voltage of P and N			
208-240V(1-phase,3-phase)			380-415V(3-phase)
In standby			
around 310VDC			around 530VDC
In operation			
With passive PFC module	With partial active PFC module	With fully active PFC module	/
>200VDC	>310VDC	>370VDC	>450VDC

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