CYT-24 Inverter Series

Service Manual

Models:

CYT009GLSI24RL CYT012GLSI24RL

CYT018GLSI24RL CYT024GLSI24RL

CONTENTS

1. Product Overview

The CYT-24 models (cassette type) are part of the DC Inverter U-match series, along with the RYT-24 (duct type) and UYT-24 (floor-ceiling type) models. The DC Inverter U-match series uses adaptive technology to match the different types of indoor units according to the room decoration design and user needs, saving warehouse management and after-sales maintenance costs. It is widely applicable for different places, such as apartments, villas, hotels, office buildings, and small and medium-sized supermarkets.

This service manual is intended for the CYT-24 models.

1.1. Indoor Units

Model	Nominal Capacity Cooling/Heating	Power Supply (V, Ph, Hz)	Appearance	Features
CT009GLSILCFHG	9500/9500(Btu/h)	208/230V~/60Hz/1P		Refrigerant leakage detection
CT012GLSILCFHG	12000/12500(Btu/h)	208/230V~/60Hz/1P		Refrigerant leakage detection
CT018GLSILCFHG	16000/18000(Btu/h)	208/230V~/60Hz/1P		Refrigerant leakage detection
CT024GLSILCFHG	23000/25000(Btu/h)	208/230V~/60Hz/1P		Refrigerant leakage detection

1.2. Outdoor Units

Model	Nominal Capacity Cooling/Heating	Power Supply (V, Ph, Hz)	Appearance	Features
YN009GLSI24RPG	/	208/230V~/60Hz/1P		/
YN012GLSI24RPG	/	208/230V~/60Hz/1P		
YN018GLSI24RPG	/	208/230V~/60Hz/1P		
YN024GLSI24RPG	/	208/230V~/60Hz/1P		

1.3. List of Standard and Optional Parts

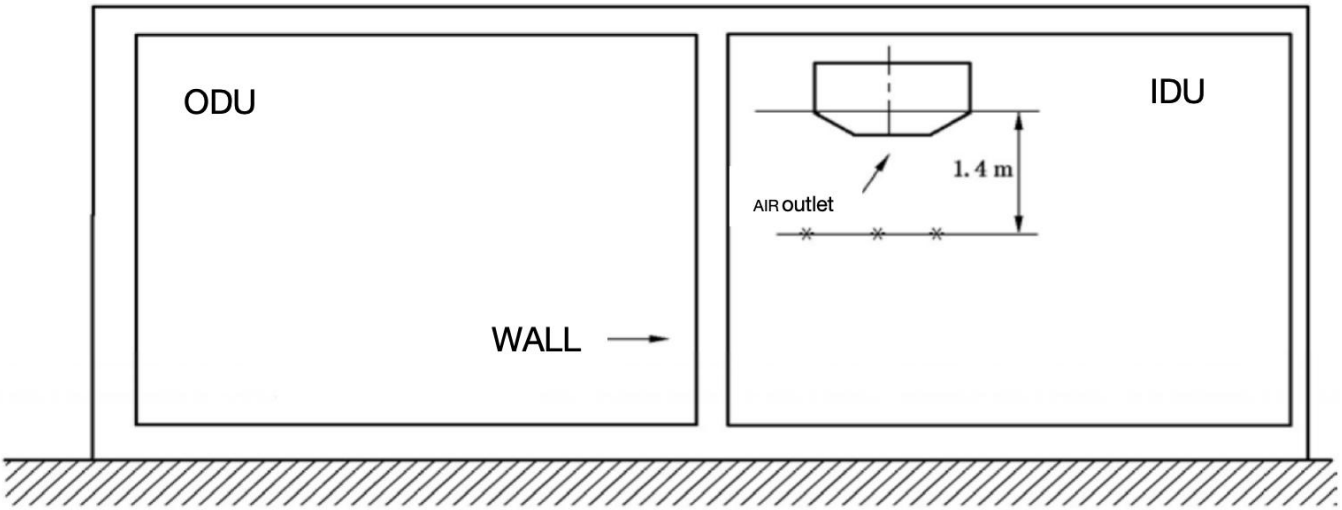
Function Type	Cassette	Duct	Floor-ceiling
Wired Controller	○	●	○
Remote Controller	●	○	●
Wi-Fi Module	○	○	○
Dry Contact Gateway	○	○	○
Central Control / BMS	○	○	○
Communication Wire for Indoor and Outdoor Units	○	○	○

1.4. Product Operation Range

Operation Temperature		°C / °F	16~31
Ambient Temperature	Indoor (Cooling/Heating)	°C	17≤ t ≤30
	Outdoor (Cooling/Heating)	°C	-15~55 / -25~30
	Indoor (Cooling/Heating)	°F	62~89 / 32~86
	Outdoor (Cooling/Heating)	°F	5~131 / -13~86

1.5. Noise

1.5.1 Indoor Unit



Model	Turbo dB(A)	H dB(A)	M dB(A)	L dB(A)	Mute dB(A)
CT009GLSILCFHG	43	41	37	33	32
CT012GLSILCFHG	45	43	39	35	32
CT018GLSILCFHG)	48	46	42	39	37
CT024GLSILCFHG	51	48	44	40	37

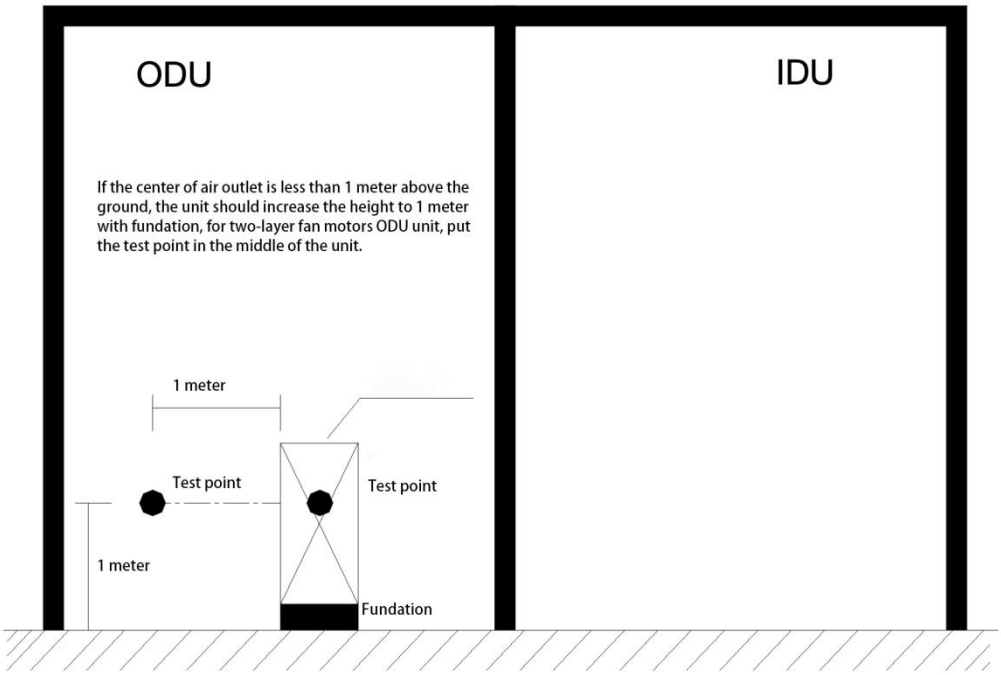
Notes:

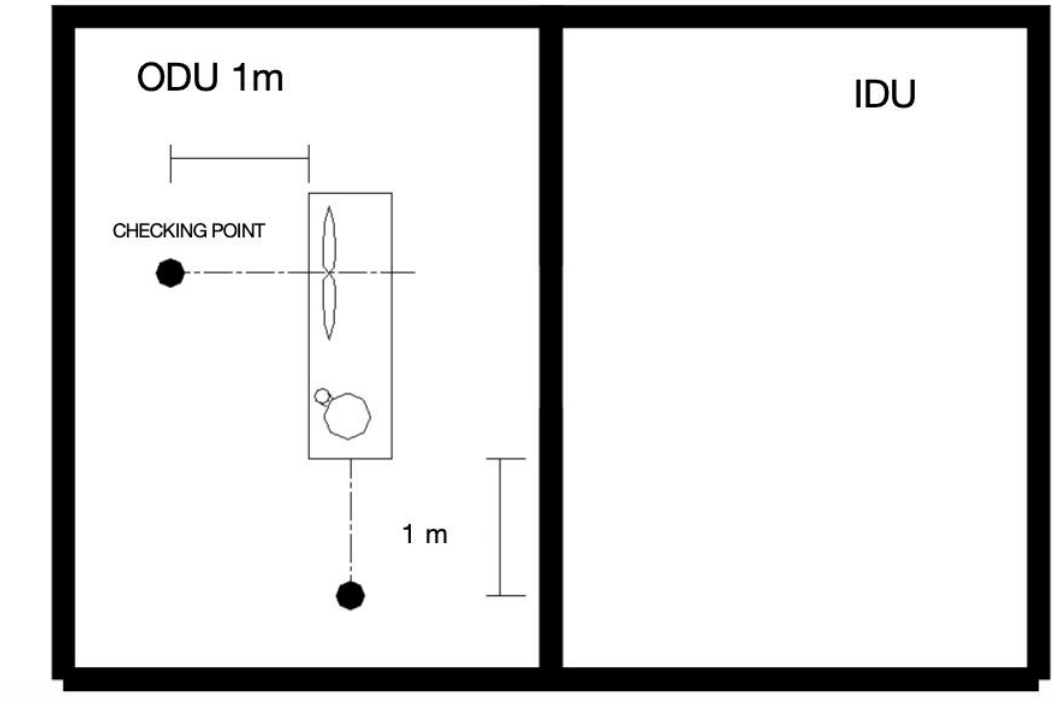
1) The above data was measured under standard conditions. Power specification: 230V~60Hz.

2) The above data was measured in a semi-anechoic room.

3) Decibels can vary depending on the changes to the external factors. For instance, the room structure. Refer to the actual measurements.

1.5.2. Outdoor Unit





Model	Sound Pressure Level dB(A)	Power Supply (V, Ph, Hz)
YN009GLSI24RPG	54	208/230V~/60Hz/1P
YN012GLSI24RPG	56	
YN018GLSI24RPG	59	
YN024GLSI24RPG	61	

2. Installation Manual

2.1. Installation Preparation

2.1.1. Installation Notices

1) Professional personnel must install the air conditioner using the Installation manual. Installation specifications must comply with our after-sale service regulations

2) When filling combustible refrigerant, any improper operations may cause serious injury or damage to people or objects.

3) Complete a leak test after finishing the installation.

4) To minimize fire risks, complete a safety inspection before maintaining or repairing an air conditioner that uses combustible refrigerant.

5) Operating the machine under a controlled procedure is essential to ensuring that any risk from combustible gas or vapor is reduced to a minimum.

2.1.2. Selection of Installation Location

⚠ **Warning!**
1) If the outdoor unit will be exposed to strong wind, it must be in a secure location, otherwise it may fall down
2) Install the air conditioner in a location where the inclination is less than 5°.
3) Do not install the unit in a location with direct sunlight.
4) Do not install the unit in a location with potential leakage of inflammable gas.

Installation Location for the Indoor Unit

Select a location that meets the following conditions:

1) The indoor unit's air inlet and outlet must be kept away from obstacles, ensuring the air flow of the unit can reach the entire room. Do not install the unit in a kitchen or laundry room.

2) Avoid installing the unit in a room with naked flames, fire sources, or the risks of refrigerant fires.

3) Select a location that is capable of withstanding 4 times the weight of the unit, without increasing operating noises and vibrations.

4) Ensure the installation location is leveled.

5) Confirm the indoor piping and wiring lengths is within the allowable range.

6) Select a location that easily drains condensation and connects to the air conditioner's drain system.

7) If using hoisting screw bolts, check whether the installation location is safe enough. If not safe, reinforce the location before installation.

8) Confirm the indoor unit, power cord, connecting wires, and communication cords are at least 3 ft (1 m) from the television and radio. This prevents image interference or noise. **Note:** Even at the distance of 3 ft (1 m), a strong electric wave may still generate noise).

Installation Location for the Outdoor Unit

Select a location that meets the following conditions:

1) Ensure the noise and air flow produced by the outdoor unit will not disturb your neighbors.

2) Select a location that is safe and away from animals and plants. If you're unable, add safety fences to protect the unit.

3) Install the outdoor unit in a place with good ventilation. Ensure the outdoor unit remains in a well-ventilated place and no obstacles nearby are obstructing the air inlet and outlet.

4) The installation location must be capable of withstanding the outdoor unit's weight and vibration. The location must allow a safe installation.

5) Avoid installing the outdoor unit in a location with leakage of inflammable gas, oil smoke, or corrosive gas.

6) Keep the outdoor unit away from strong wind because strong wind will affect the outdoor fan, leading to insufficient air flow volume. This will affect the unit’s performance.

7) Install the outdoor unit in a convenient location for easy connection to the indoor unit.

8) Keep the outdoor unit from any object that may result in the air conditioner to generate noise.

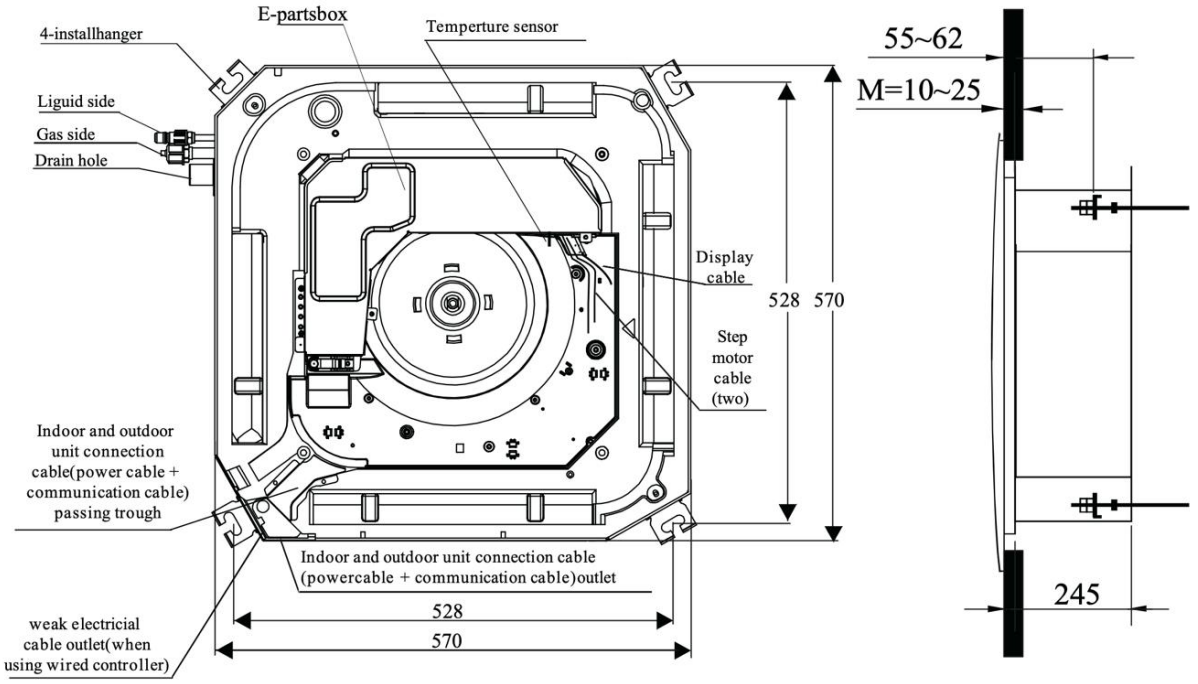
9) Install the outdoor unit in a location that can easily drain condensation.

2.1.3. Unit Dimension

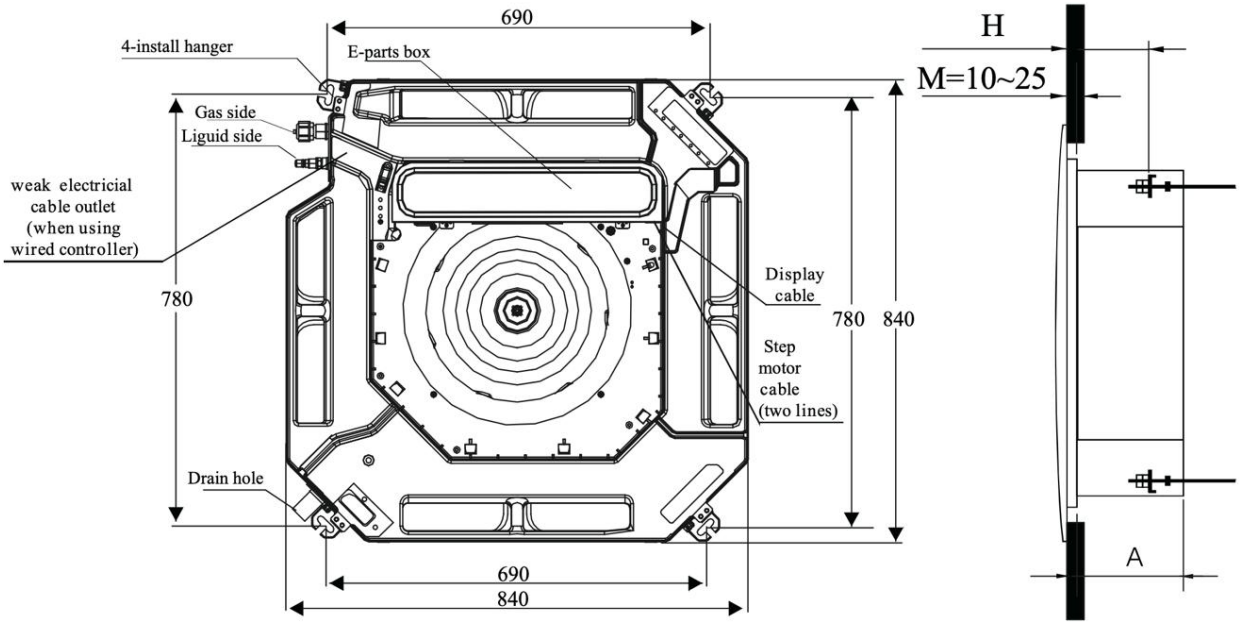
⚠WARNING!
1) Install the indoor unit in a location that can withstand a load of at least 5 times the weight of the main unit and will not amplify the sound or vibration.
2) If the installation location is not strong enough, the indoor unit may fall and cause injuries.
3) If the job is completed using the panel frame only, there is a risk that the unit will come loose.

Indoor Unit Dimension

9K, 12K, and 18K:



24K:

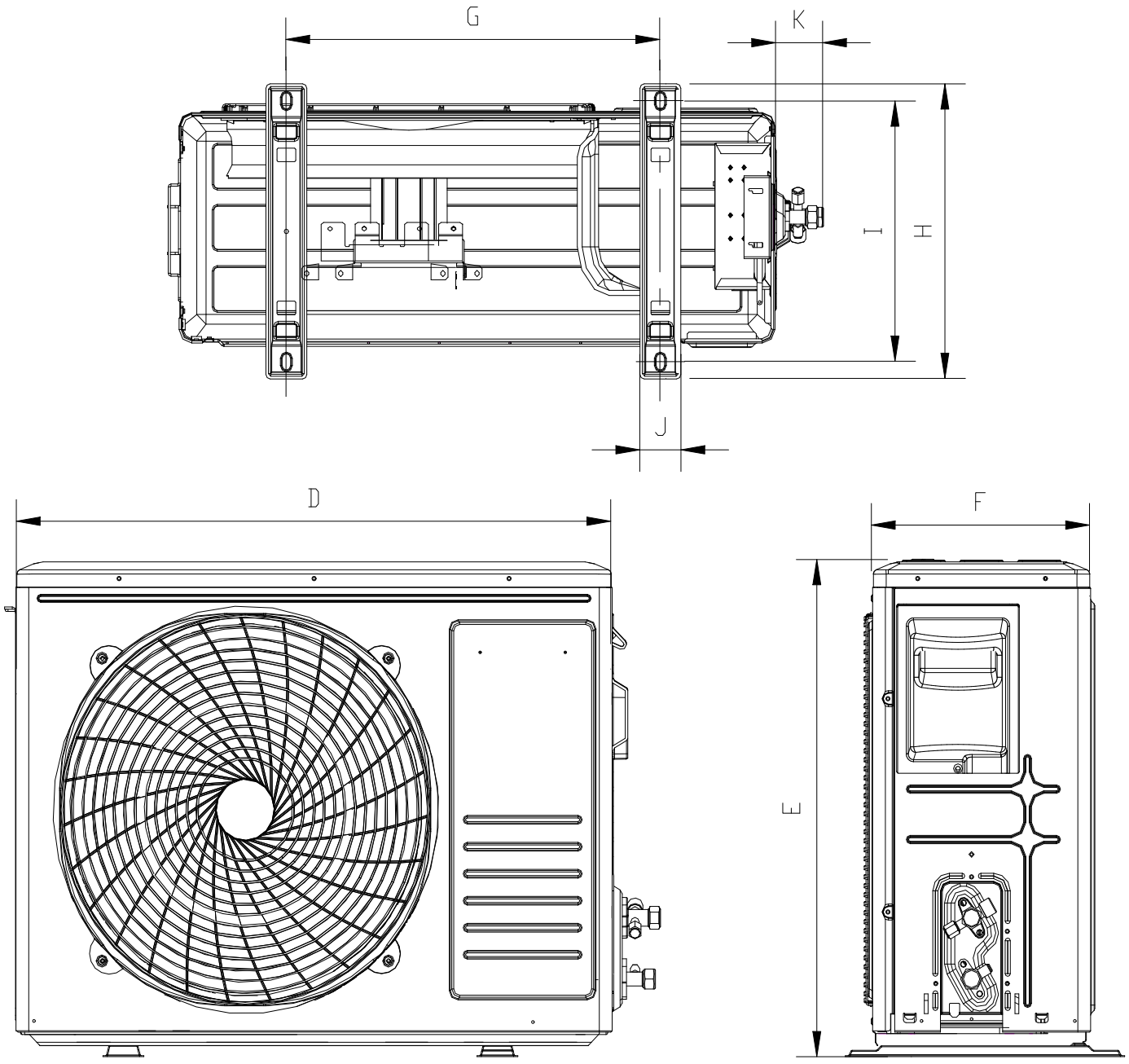


(in/mm)

Model	A	H
CT009GLSILCFHG **CT012GLSILCFHG** **CT018GLSILCFHG**	10 in / 245 mm	5.1-5.3 in / 130-135 mm
CT024GLSILCFHG	10 in / 245 mm	5.1-5.3 in / 130-135 mm

Outdoor Unit Dimensions

Models: YN009GLSI24RPG, YN012GLSI24RPG, YN018GLSI24RPG, YN024GLSI24RPG



Outdoor Unit (in/mm)

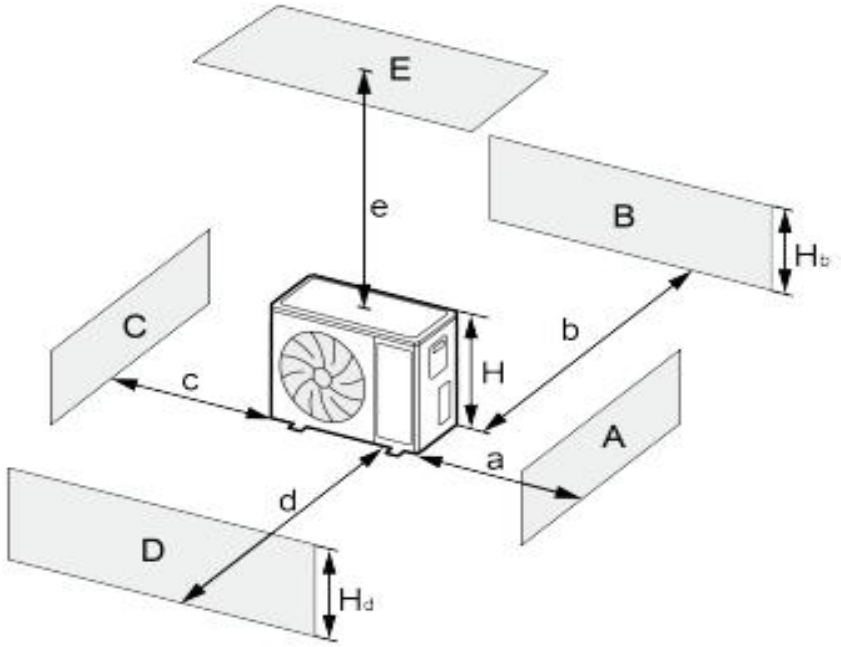
Model	D	E	F	G	H	I	J	K
YN009GLSI24RPG	28 / 712	20 / 498	9 / 234	16 / 415	11 / 291	9 / 225	2 / 48.5	2 / 52
YN012GLSI24RPG	28 / 712	20 / 498	9 / 234	16 / 415	11 / 291	9 / 225	2 / 48.5	2 / 52
YN018GLSI24RPG	31 / 795	22 / 549	10 / 252	17 / 434	12 / 305	11 / 278	2 / 48	2.5 / 63
YN024GLSI24RPG	33 / 845	27 / 693	13 / 336	23 / 586	15 / 375	14 / 347	2 / 58.6	2.5 / 65

2.1.4. Diagram of Unit Installation Space and Location

Diagram of Installation Space and Location for the Outdoor Unit

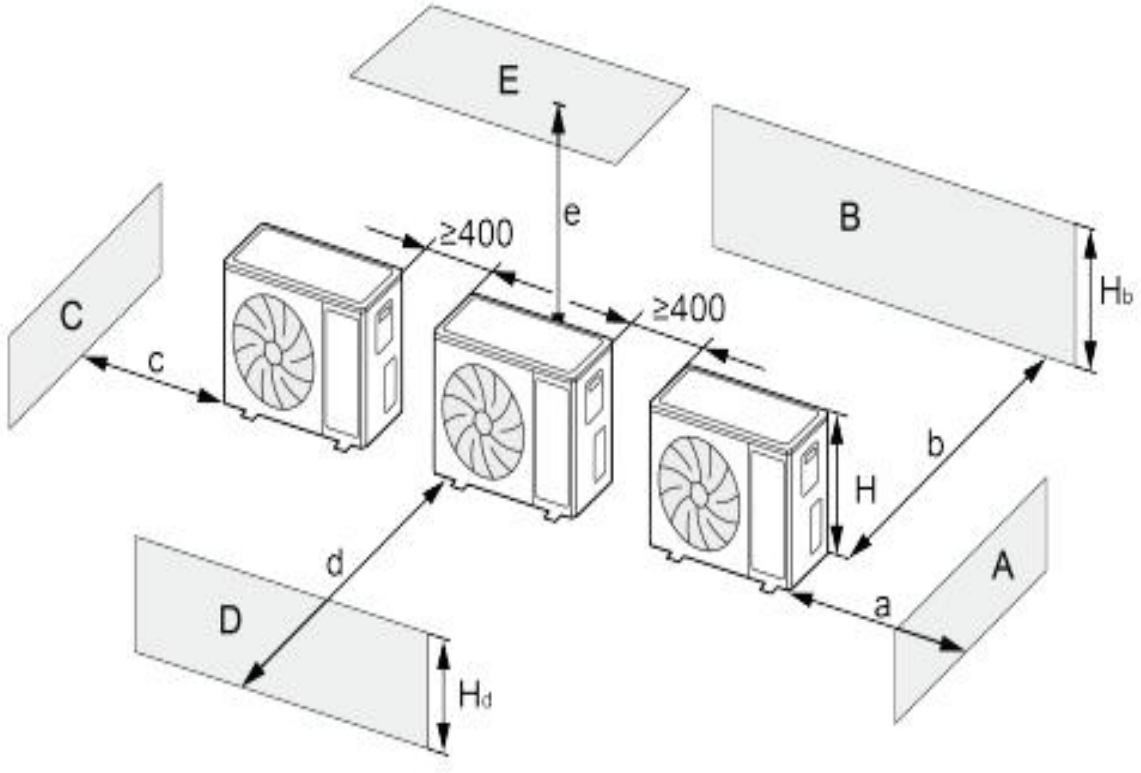
Notice: For the outdoor unit's best performance, ensure the installation space conforms to the following dimensions.

Installing 1 Outdoor Unit:



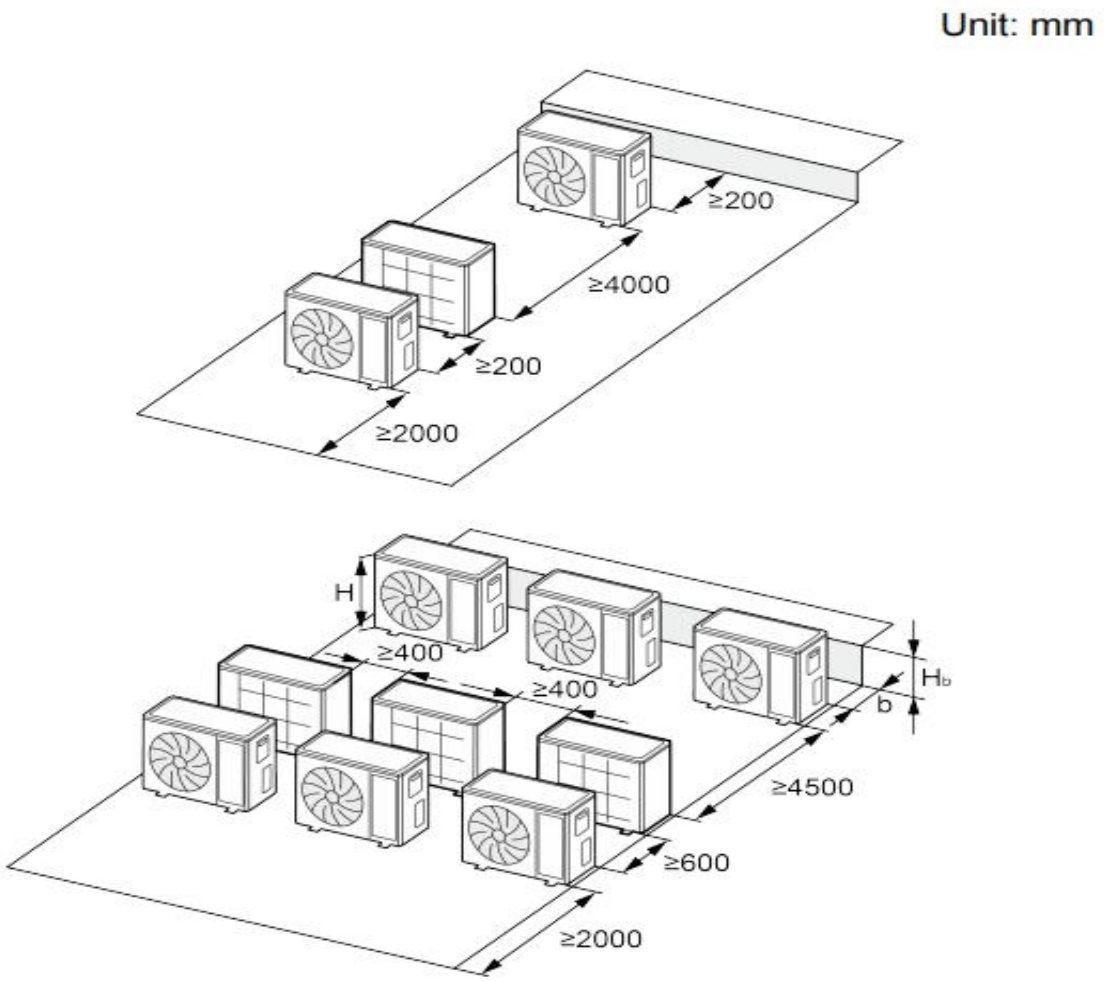
A~E	Hb Hd H		in/mm				
			a	b	c	d	e
B	——		——	≥4 in / 100 mm	——	——	——
A, B, C	——		≥12 in / 300 mm	≥4 in / 100 mm	≥4 in / 100 mm	——	——
B, E	——		——	≥4 in / 100 mm	——	——	≥39 in / 1000 mm
A, B, C, E	——		≥12 in / 300 mm	≥6 in / 150 mm	≥6 in / 150 mm	——	≥39 in / 1000 mm
D	——		——	——	——	≥39 in / 1000 mm	——
D, E	——		——	——	——	≥39 in / 1000 mm	≥39 in / 1000 mm
B, D	Hb < Ha	Hd > H	——	≥4 in / 100 mm	——	≥39 in / 1000 mm	——
	Hb > Hd	Ha < H	——	≥4 in / 100 mm	——	≥39 in / 1000 mm	——
B, D, E	Hb < Ha	Hb ≤ 1/2H	——	≥10 in / 250 mm	——	≥79 in / 2000 mm	≥39 in / 1000 mm
		1/2H < Hb ≤ H	——	≥10 in / 250 mm	——	≥79 in / 2000 mm	≥39 in / 1000 mm
		Hb > H	Prohibited				
	Hb > Ha	Ha ≤ 1/2H	——	≥4 in / 100 mm	——	≥79 in / 2000 mm	≥39 in / 1000 mm
		1/2H < Hd ≤ H	——	≥8 in / 200 mm	——	≥79 in / 2000 mm	≥39 in / 1000 mm
		Hd > H	Prohibited				

Installing 2 or More Outdoor Units Side-By-Side:



A~E	Hb Hd H		in/mm				
			a	b	c	d	e
A, B, C	——		≥12 in / 300 mm	≥12 in / 300 mm	≥39 in / 1000 mm	——	——
A, B, C, E	——		≥12 in / 300 mm	≥12 in / 300 mm	≥39 in / 1000 mm	——	≥39 in / 1000 mm
D	——		——	——	——	≥79 in / 2000 mm	——
D, E	——					≥79 in / 2000 mm	≥39 in / 1000 mm
B, D	Hb < Ha	Hd > H	——	≥12 in / 300 mm	——	≥79 in / 2000 mm	——
	Hb > Ha	Hd ≤ 1/2H	——	≥10 in / 250 mm	——	≥79 in / 2000 mm	——
		1/2H < Hd ≤ H	——	≥12 in / 300 mm	——	≥98 in / 2500 mm	——
B, D, E	Hb < Ha	Hb ≤ 1/2H	——	≥12 in / 300 mm	——	≥79 in / 2000 mm	≥39 in / 1000 mm
		1/2H < Hb ≤ H	——	≥12 in / 300 mm	——	≥98 in / 2500 mm	≥39 in / 1000 mm
		Hb > H	Prohibited				
	Hb > Ha	Hd ≤ 1/2H	——	≥10 in / 250 mm	——	≥98 in / 2500 mm	≥39 in / 1000 mm
		1/2H < Hd ≤ H	——	≥12 in / 300 mm	——	≥98 in / 2500 mm	≥39 in / 1000 mm
		Hd > H	Prohibited				

Installing Outdoor Units in Rows:



Hb H	in (mm)
Hb ≤ 1/2H	b ≥ 9.8 in (250mm)
1/2H < Hb ≤ H	b ≥ 11.8 in (300mm)
Hb > H	Prohibited

Installing Outdoor Units Above One Another:

Unit: mm

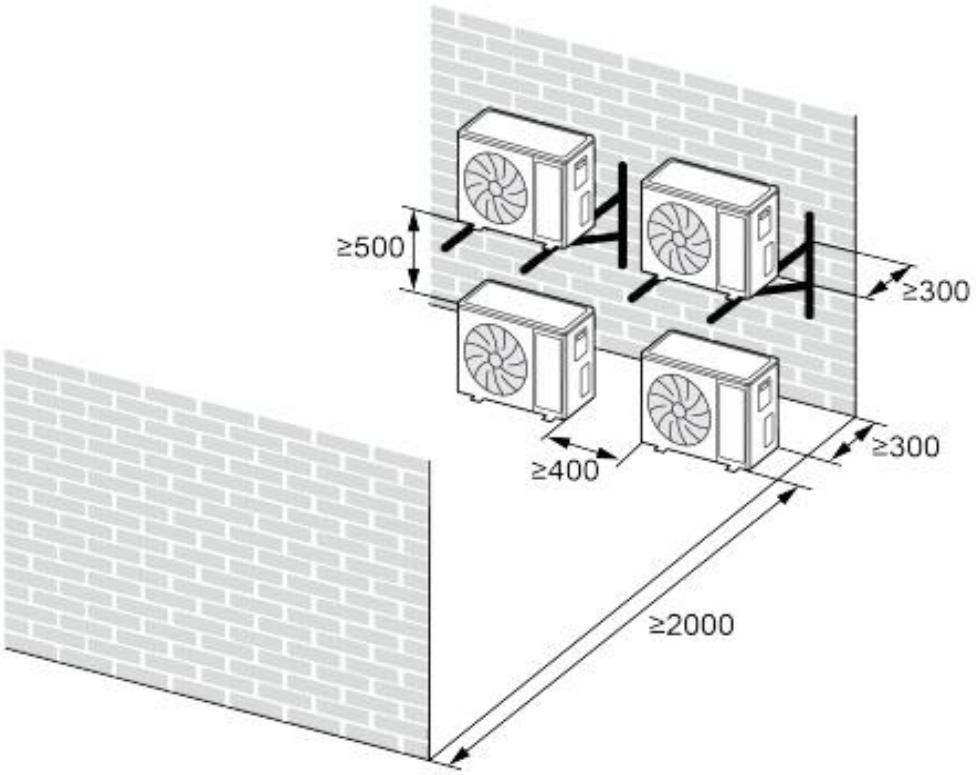
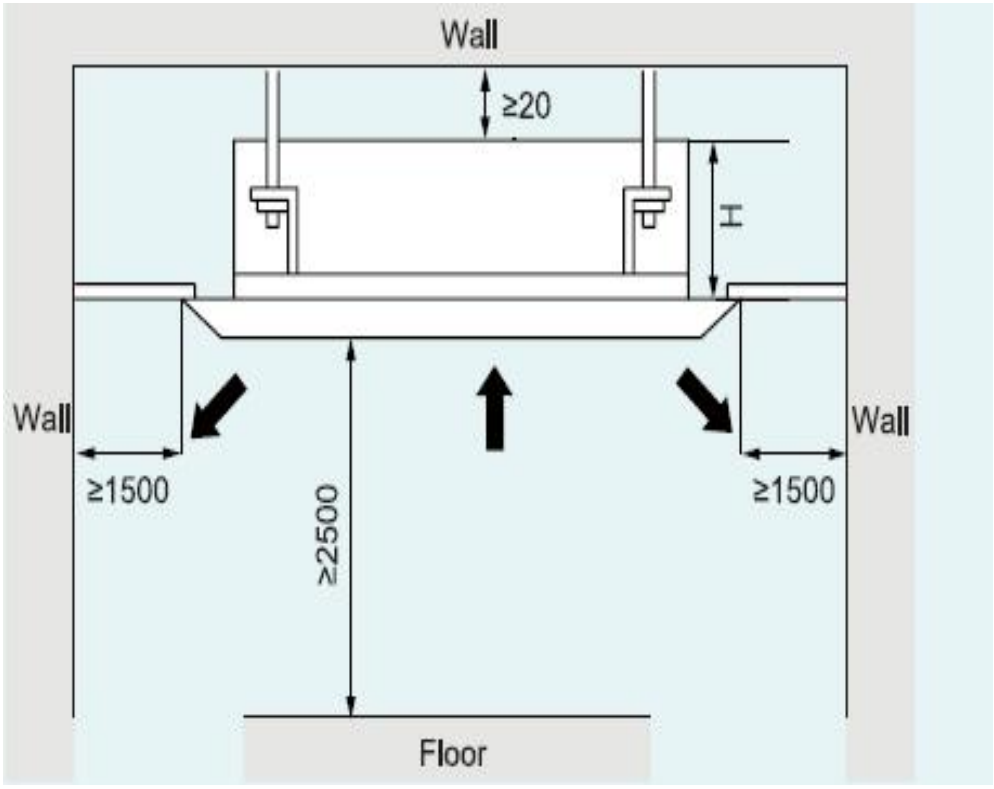


Diagram of the Installation Location and Space for Indoor Unit

Note: For the indoor unit's best performance, ensure its installation space conforms to the following installation dimensions:



2.2. Unit Installation

2.2.1. Indoor Unit Installation

Preparation for Installing the Indoor Unit
Height between the ceiling and floor. The installation height between the ceiling and floor must be greater than 8.2 ft (2.5 m). Ceiling hole and the hook installation.

Preparation Work on the Ceiling:

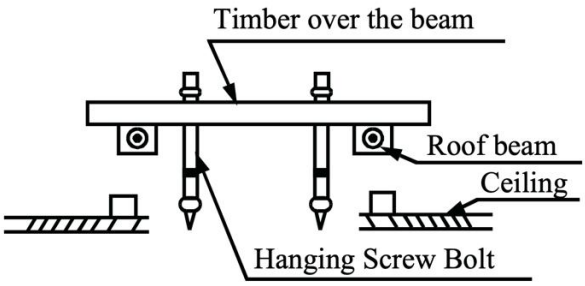
- Installation methods should change based on the different construction structures. Consult a professional for the detailed information.
- After opening a hole, ensure the ceiling is horizontal and strong enough to prevent vibration. Cut the beams at the hole, then remove them. Reinforce the beams that have been cut and the beams fixing the ceiling.

Installation of the Hanging Screw Bolt

Use a bolt with a M10 whorl. The center distance between the bolts is decided by the size of the unit. Use the following method to install:

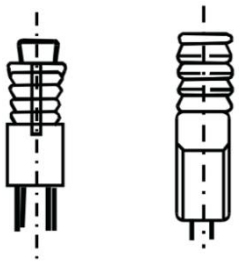
Wooden Construction

Put the square timber over the roof beam, then install the hanging screw bolts.



Finished Concrete Bricks

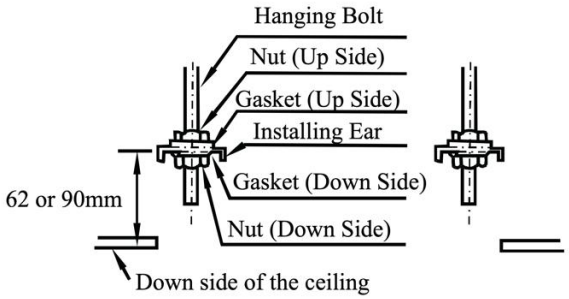
Install the hanging hook with an expansible bolt into the concrete at least 1.8~1.9 in (45~50 mm) deep to prevent it from becoming loose.



Overhanging the Indoor Unit

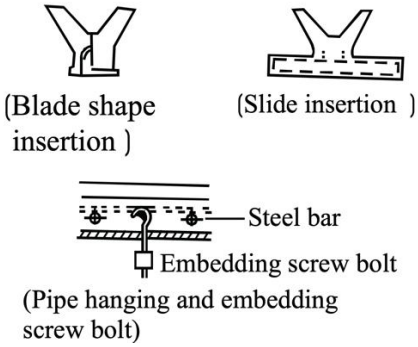
Cassette: Adjust the gasket (downside) to 3.5 in (90 mm) over the ceiling.

Compact Cassette: Adjust the gasket (downside) to 2.4 in (62 mm) over the ceiling.



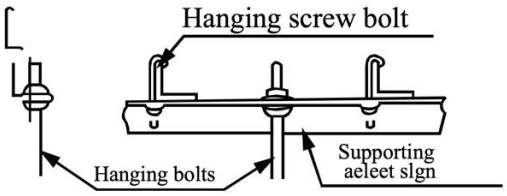
New Concrete Bricks

Inlay or embed the screw bolts.

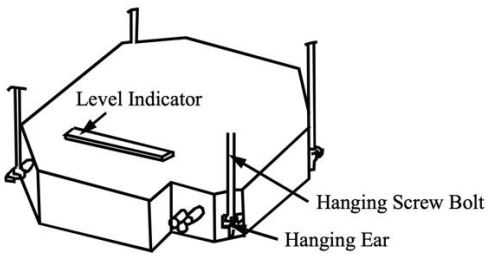


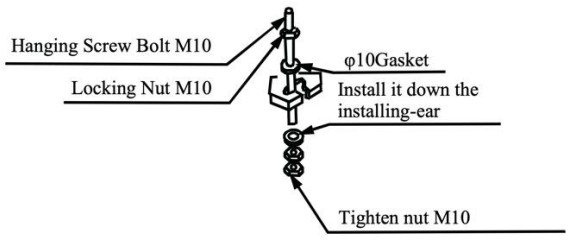
Steel Beam Roof Structure

Install the supporting angle steel.



Install the hanging bolt into the T groove of the hanging tool. Hang the indoor unit and ensure it's level using a level indicator.



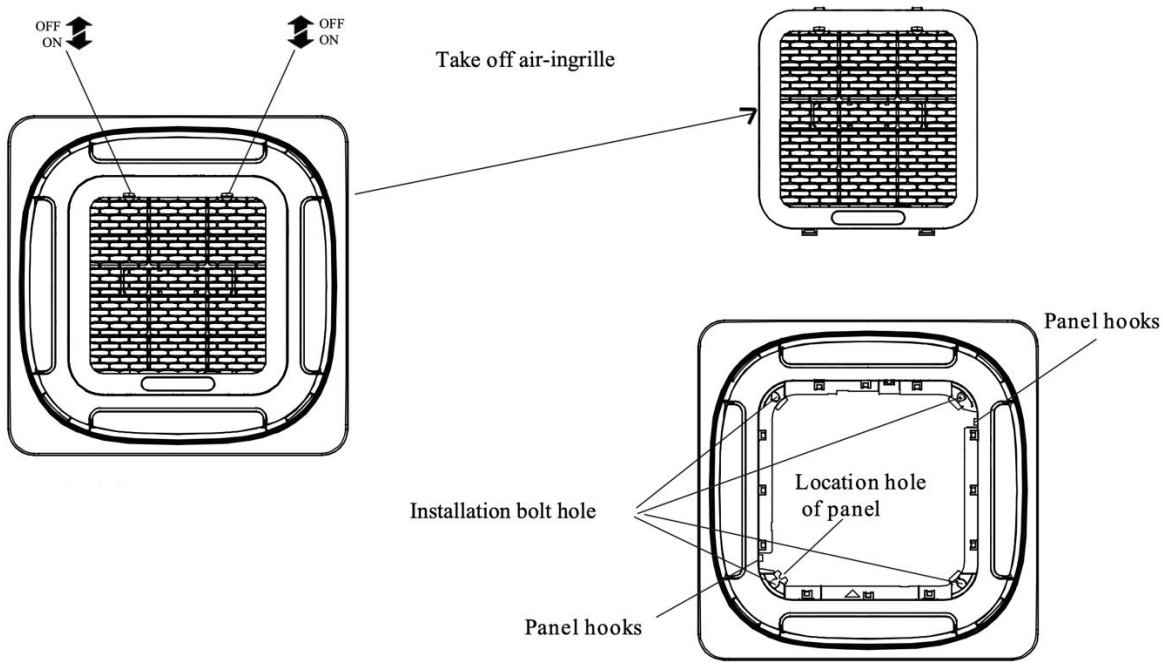


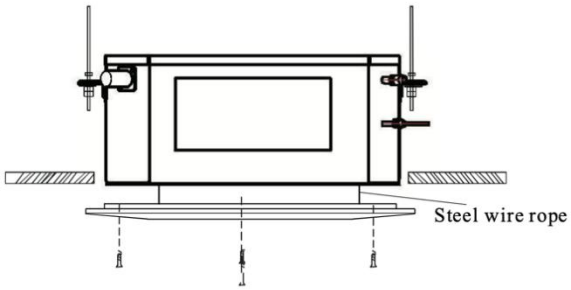
Panel Installation:

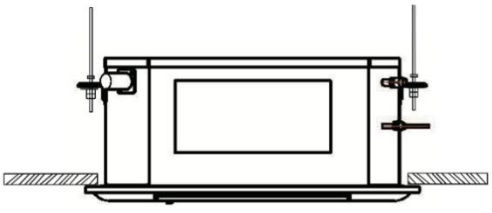
- Complete the panel installation after the piping and wiring.
- Confirm the indoor unit and ceiling hole installation size before installation.

Caution: Seal the connection parts between the ceiling and indoor unit panels, as well as the small gaps that may cause wind/water leakage or condensing water.

Cassette Dimension: 18K







1. Screw 2 M5*20 bolts at the opposite angles of the indoor unit. Before fixing the screws, determine the orientation of the panel: Align the positioning holes on the panel with the box's positioning pins.

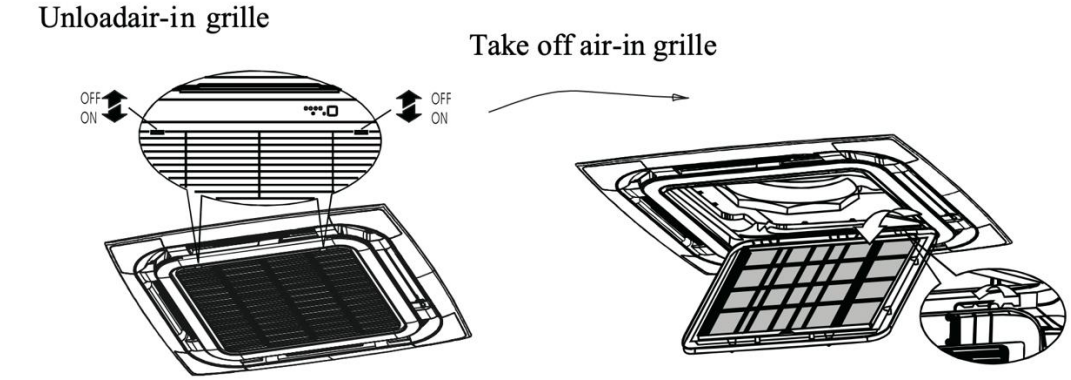
2. Connect the step motor and display board wires to the electrical box according to electric wiring diagram on the electrical box.

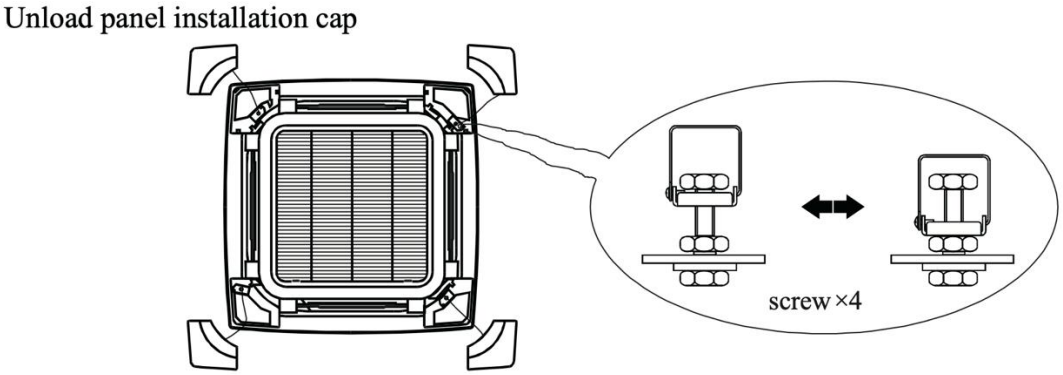
3. Screw the other 2 M5*20 bolts through the holes of the panel into the indoor unit.

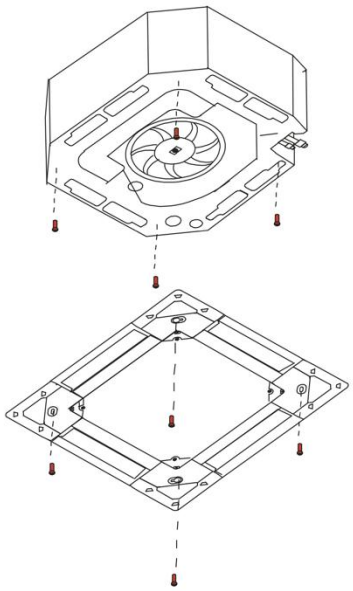
4. Adjust the panel's location and direction to align its louver with the outdoor unit's outlet. Fasten all bolts to firmly press the panel and indoor unit together.

5. Return the air-in grille and panel back to the indoor unit.

Cassette Dimension: 24K







1. Screw the M10 gasket and M6*20 bolt at the corner of indoor unit. Before fastening the screws, fasten the other 2 additional bolts, which are the red bolts shown in the figure. Notice that the direction of the red arrow on the electrical box aligns with the one on the panel.

2. Connect the step motor and display board wires to the electrical box according to the electric wiring diagram on the electrical box.

3. Screw the other 2 M6*20 bolts with the M10 gasket through the hole of the panel into the indoor unit.

4. Adjust the panel's location and direction to align its louver with the outdoor unit's outlet. Fasten all bolts to firmly press the panel and indoor unit together.

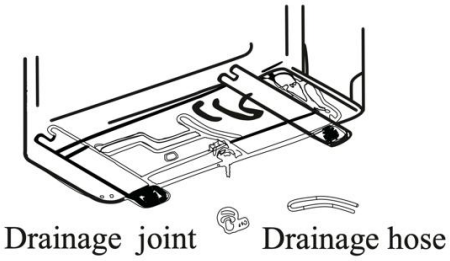
5. Return the air-in grille and panel back to the indoor unit.

2.2.2. Outdoor Unit Installation

- Install the outdoor unit on a solid wall and fasten the unit securely.
- Before connecting the pipes and cables, select the position on the wall and leave enough space for maintenance.
- Fasten the support to the wall using screw anchors, which are particularly suited for the type of wall.
- To avoid vibration during operation, use a larger quantity of screw anchors than normally required. Keep the anchors fastened in the same position for years without the screws becoming loose.
- Install the unit following the national regulations.

Outdoor Unit Condensed Water Drainage (Heat Pump Models Only)
Drain the condensed water and ice formed in the outdoor unit during heating operation through the drain pipe.

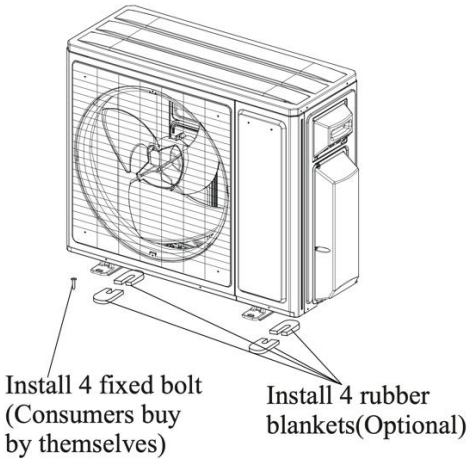
1) Fasten the drain port in the 1 in (25 mm) hole placed in the part of the unit, as shown in the picture.



2) Connect the drain port and drain pipe. Ensure the water is draining in a suitable place.

Fix the Outdoor Unit

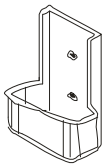
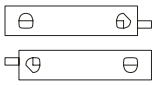
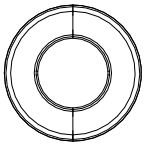
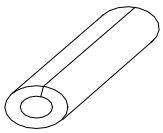
1) Mark the installation position for the expansion bolts according to the outdoor unit installation dimensions.
2) Drill holes, then clean the concrete dust. Place the bolts.
3) If applicable, install 4 rubber blankets on the hole before placing the outdoor unit (optional). This reduces vibrations and noise.
4) Place the outdoor unit base on the bolts and pre-drilled holes.
5) Use the wrench to firmly fix the outdoor unit with bolts.



Note: The outdoor unit can be fixed on a wall-mounting bracket. Follow the wall-mounting bracket instructions to fix the wall-mounting bracket on the wall. Then fasten the outdoor unit on the wall-mounting bracket and keep it horizontal. The wall-mounting bracket must be capable of supporting at least 4 times the weight of the outdoor unit.

2.2.3. Connection Pipe Installation

Installation Notice and Connection Pipe Accessory Requirements

Remote controller 	Remote controller supporter 	Batteries 	Vinyl tape 
Drain hose 	Hole cover 	Screw 	Insulation material 

Tools

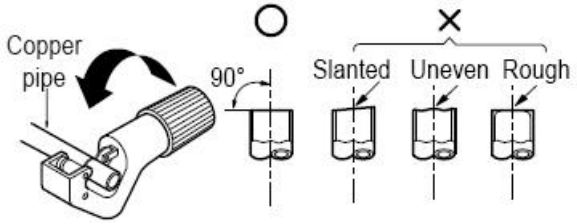
Tool Name	Picture	Tool Name	Picture	Tool Name	Picture
Standard wrench		Pipe cutter		Vacuum pump	
Adjustable/ Crescent wrench		Screw drivers (Phillips and Flat blade)		Safety glasses	
Torque wrench		Manifold and gauges		Work gloves	
Hex keys or Allen wrenches		Level		Refrigerant scale	
Drill and drill bits		Flaring tool		Micron gauge	
Hole saw		Clamp on Amp meter			

Pipe Flaring

Main cause for gas leakages is due to defects in flaring work. Carry out the correct flaring work in the following procedure:

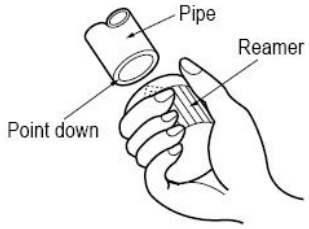
A. Cut the Pipes and Cable

1) Use the piping kit accessory or the pipes purchased locally.
2) Measure the distance between the indoor and outdoor units.
3) Cut the pipes a little longer than the measured distance.
4) Cut the cable 5 ft (1.5 m) longer than the pipe length.



B. Burrs Removal

1) Completely remove all burrs from the cut cross section of the pipe/tube.
2) Put the end of the copper tube/pipe in a downward direction while removing the burrs in order to avoid dropping burrs into the tubing.

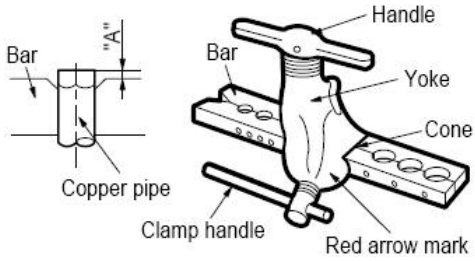


C. Flaring Work

1) Carry out the flaring work using a flaring tool, as shown below.

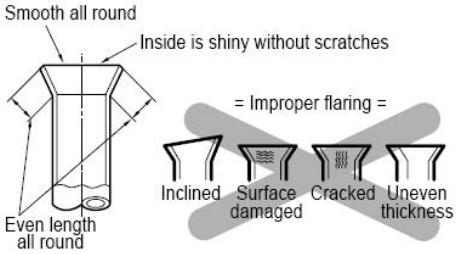
Outside Diameter		A
inch	mm	mm
0.25 in	ø6.35	0.04~0.06 in (1.0~1.3 mm)
0.375 in	ø9.52	0.03~0.04 in (0.8~1.0 mm)
0.5 in	ø12.7	0.02~0.03 in (0.5~0.8 mm)
0.625 in	ø15.88	0.02~0.03 in (0.5~0.8 mm)

2) Firmly hold the copper pipe in a die in the dimension shown in the table above.



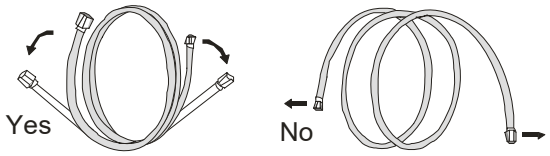
D. Check

1) Compare the flared work with the figure below.
2) If the flare is noted to be defective, cut off the flared section and repeat the flaring work.



Pipe Bending

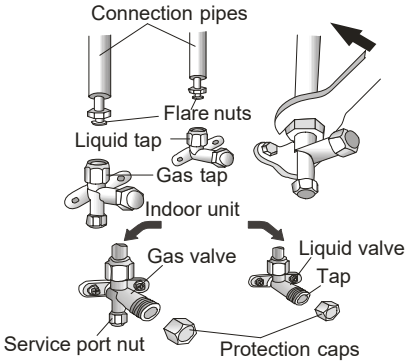
- Do not remove the cap from the pipe. The cap prevents dampness or dirt from entering.
- If the pipe is bent or pulled too often, it will become stiff. Do not bend the pipe more than 3 times at one point.
- When extending the rolled pipe, straighten the pipe by unwinding it gently, as shown in the picture.



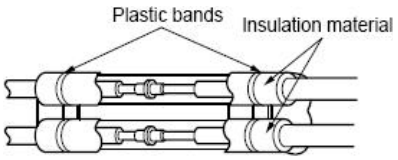
Extending the rolled pipe

The Connection Pipe of the Indoor and Outdoor Units
Screw the flare nuts to the outdoor unit coupling with the same tightening procedures described for the indoor unit.

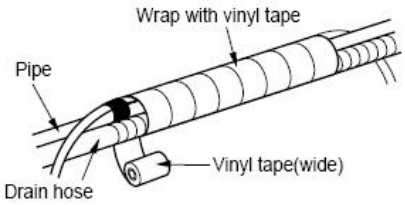
Note: If the tightening torque is not sufficient, there will probably be leakage. With excessive tightening torque there will also be some leakage, as the flange could be damaged.



Thermal Insulation of the Pipe Joint (Indoor Unit Only)
Overlap the connection pipe insulation material and the indoor unit pipe insulation material. Bind them together with vinyl tape so that there is no gap.



Wrap the area that accommodates the rear piping housing section with vinyl tape. Wrap the piping and drain hose together with vinyl tape where they snuggly fit into the rear piping housing section.



2.2.4. Connection Pipe Vacuum Pumping and Leak Detection

Vacuum Pump Connection
Compressor malfunctions occur if air and humidity is left inside the refrigerant circuit. After connecting the indoor and outdoor units, use a vacuum pump to bleed the air and humidity from the refrigerant circuit.

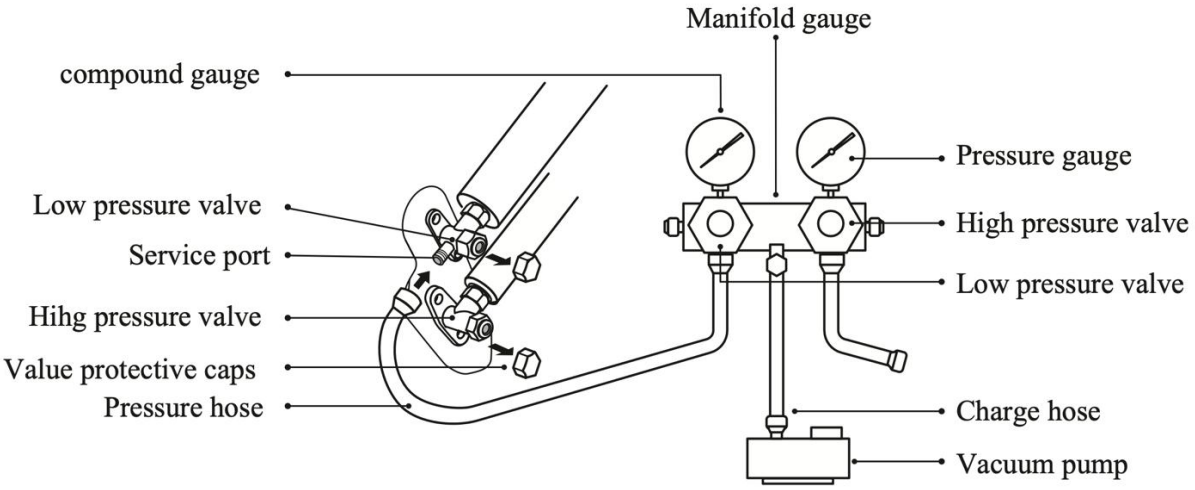
1) Remove the caps of the liquid and gas valves, as well as the service port.

2) Meanwhile, keep the gas and liquid valves closed in case of refrigerant leak.

3) Connect the hose used for evacuation to the vacuum pump.

4) Open the switch on the lower-pressure side of the manifold valve assembly.

5) Meanwhile, keep the switch on the high-pressure side of the manifold valve assembly closed. Otherwise, evacuation would fail.



Vacuum Pumping

1. Switch on the vacuum pump and vacuum the system for 20-45 min, until the pressure gauge reaches the degree of 0.1Mpa (-750mmHg).

2. Switch off the vacuum pump and wait for 10 min to check if the system pressure remains at -0.1MPa. If the pressure increases, there may be leakage. Check and repair the leakage point.

3. Slightly open the liquid valve and allow some refrigerant go to the connection pipe. This balances the pressure of the connection pipe, so the air won't come into the connection pipe when removing the hose.

4. Remove the manifold, then completely open the core of the gas and liquid valves. The gas and liquid valves can only be fully opened after the manifold valve assembly is removed.

5. Tighten the screw cap of the valves and service port.

Reference: The evacuation duration depends on the unit's capacity, generally:

Model	Time (min)
YN009GLSI24RPG / YN012GLSI24RPG	20
YN018GLSI24RPG	30
YN024GLSI24RPG	45

Leak Detection Methods
There are two ways to check gas leakage:

1. Leakage Detector
Use a leakage detector to check if there is leakage.

2. Soap Water
If a leakage detector is not available, use soap water for leakage detection. Apply soap water to the suspected position and keep it there for more than 3 min. If there are bubbles coming out of this position, repairs are needed.

How to Check the System Gas Leakage?

Check Each Welding Point
Check if the welding points are smooth and free of any obvious welding holes or other abnormal conditions.

Fill High-Pressure Nitrogen into the System for Leak Detection
If only the outdoor unit needs to repair and the indoor unit is operating normal, then it's to charge high-pressure nitrogen into the outdoor unit only. Fill the nitrogen simultaneously from high-pressure side and low-pressure side. We recommend charging the nitrogen from the 2-way and 3-way valves at the same time. The pressure of nitrogen should be above 20kgf. Then use soapy water to check for leaks. Check the welding points particularly.

Retain the Pressure of the System
Fill high-pressure nitrogen into the system and maintain the pressure above 25kgf. Close the 2-way and 3-way valves and retain the pressure of the indoor and outdoor units for more than 12 hours. If the pressure remains unchanged, then start vacuum pumping. Otherwise, check the system for leaks again.

Consider the temperature when judging the pressure variation. If the temperature changes 34°F (1°C), the pressure will change around 0.01MPa also.

For example, if the temperature is 86°F (30°C) when nitrogen of 2.5MPa is charged, and the temperature changes to 77°F (25°C) after 12 hours. We consider that the system is qualified if the pressure is found at 2.43MPa or above.

NOTE
Before and during operation, use an appropriate refrigerant leak detector to monitor the operation area and make sure the technicians can be well aware of any potential or actual leakage of inflammable gas. Make sure the leak detecting device is applicable to inflammable refrigerant. For example, it should be free of sparks, completely sealed, and safe in nature.

2.2.5. Adding Refrigerant

1. Before charging refrigerant, confirm the air conditioner is switched off.

2. Connect the gas bottle and the 3-way valve's outdoor service port with the hose. The hose and service port are not connected tightly enough, right now, to facilitate the air discharge in the hose.

3. Open the gas bottle valve slightly to discharge air from the hose through the outdoor unit's service port. After, connect the hose with the service port reliably, then close the gas bottle valve at the same time.

4. Switch on the air conditioner in Cooling mode and open the gas bottle valve, then the air conditioner's refrigerant can be charged to the appropriate amount.

Note:

1. When quantitative gas charging is needed, determine the amount you need to add by using an electronic scale to avoid insufficient or overcharging.

2. No air is allowed into the AC system, due to it being very dangerous while it’s in operation.

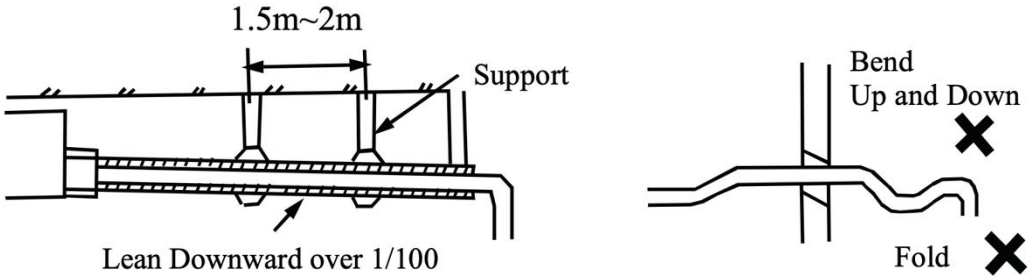
2.2.6. Installation of Drain Pipe

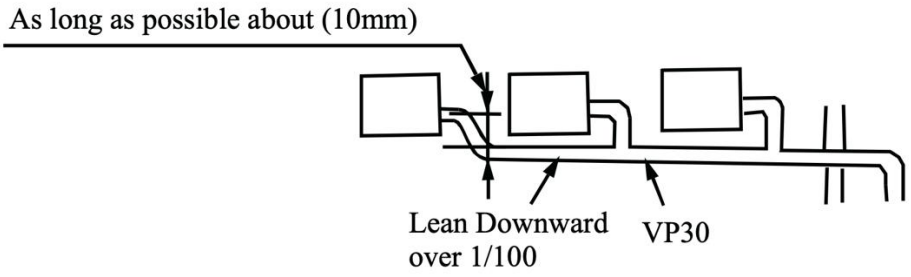
Indoor Side Drain Pipe

CAUTION

Be sure to follow this Installation Manual during drainage installation, the drainage pipe must have the heat insulation to prevent condensing.

- Confirm the drain pipe and connections of the indoor unit have heat insulation, or the indoor unit will condense dew.
- The drain pipe's downward slope should not exceed 1:100, and it must be free of winding and bending.
- When pulling the total length of the drain pipe out diagonally, it must not exceed 66 ft (20 m). If it’s a long pipe, install a prop stand every 5-6.5 ft (1.5-2 m) to prevent winding.
- Refer to the figures below about the installation of the pipes.
- Do not impose any pressure on the connection part of the drainage pipe.





Drainage Pipe Material | Heat-Insulating Material

Use the listed material:

Drainage Pipe Material	Polyvinyl chloride pipe (φ 1.3 in / 32 mm outer diameter)
Heat Insulation Material	Foamed polyethylene insulation plate (0.4 in / 10 mm thickness)

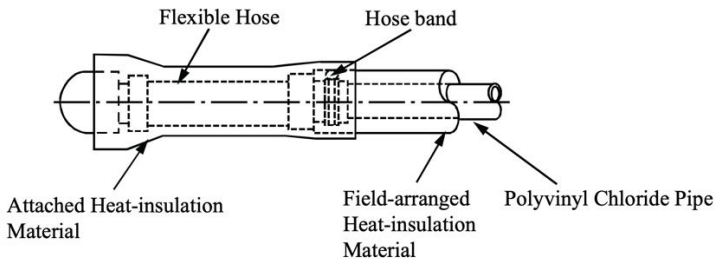
Connection Procedure

Connect the transparent pipe with the polyvinyl chloride pipe.

- Use polyvinyl chloride glue at the connection part of the drainage pipe. Ensure there is no water leakage.
- Paste 1.6 in (40 mm) of glue at the front of the polyvinyl chloride pipe. Insert it into the transparent pipe.
- The glue needs 10 min to dry. Do not force pressure on the connection during the drying period.

Heat Insulation

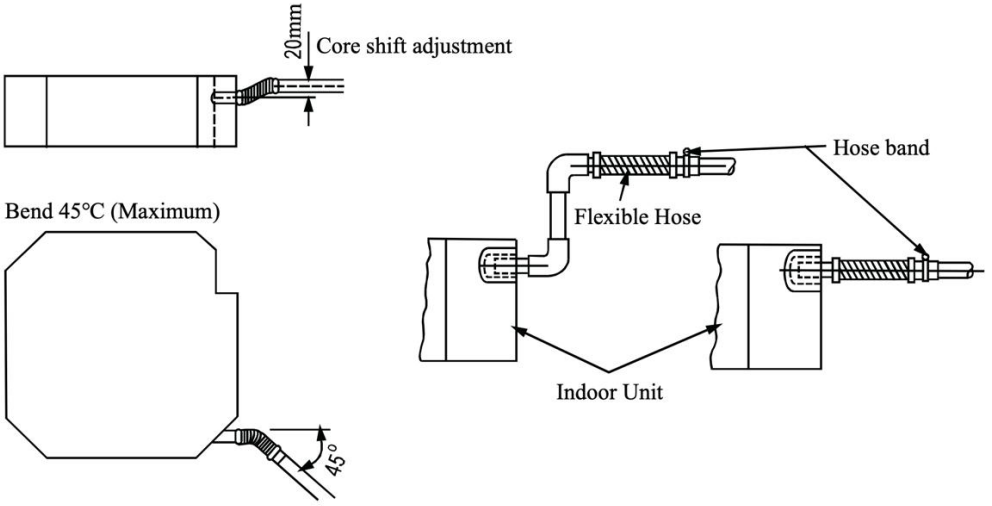
Wrap the flexible hose carefully with the attached heat-insulation material from the start to the end (to indoor part).



Flexible Hose

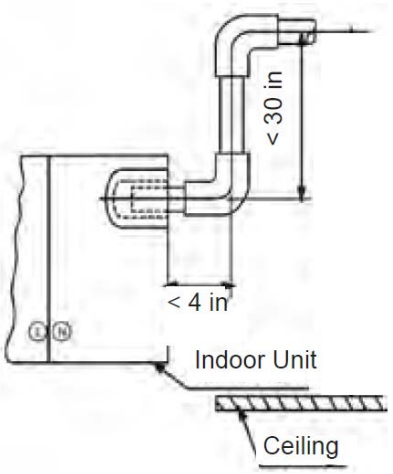
Measure the diameter of the hard pipe using the cutting method, and adjusting the joining angle.

- Pull out the flexible hose. Do not over deform than illustrated below.
- Be sure to bind the flexible hose with the attached band.
- Place the flexible hose horizontally.



Drainage Upward

To ensure the drainage pipe won't slant downward, lead it upward to a maximum height of 30 inches (762 mm), then lead it downward.



Drainage Test

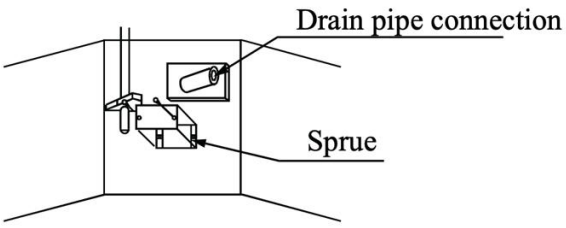
Check whether the drain pipe is unhindered before testing.

1) Collect water from the sprue to check.

2) Collect 1.3 pint (600 ml) of water with a pot or hose from the sprue slowly. Prevent touching the drain pump motor.

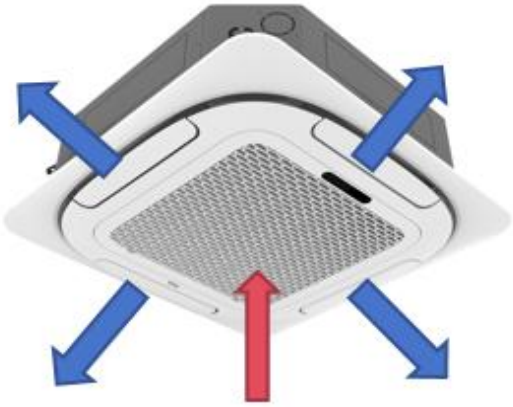
3) After the preparation work, disconnect the water level switch. Power 220-240V to the AC of the terminal board, then the drain pump will start immediately.

4) After the drain pump runs for 2 min, reset the water level pin. The drain pump motor will stop after running for 22 min.



2.2.7. Return Air Method

Air inlet downward and air outlet around.



2.3. Electrical Installation

2.3.1. Requirement and Notice on Electrical Installation

The electrical installation for the air conditioner must observe the following requirements:

1) Professionals must conduct the electrical installation in compliance with local laws and regulations and the instructions in this manual.

2) Never extend the power cord.

3) Equip the electric circuit with a circuit breaker and air switch, both with sufficient capacity.

4) Ensure the unit’s operating power is within the nominal range stated in the instruction manual. Use a specialized power circuit for the air conditioner. Do not draw power from another power circuit.

5) The air conditioner circuit must be at least 4.9 ft (1.5 m) away from any inflammable surface.

6) Confirm the external power cord, connection wire of the indoor and outdoor units, and the communication cords are effectively fixed.

7) Ensure the external power cord, connection wire of the indoor and outdoor units, and the communication cords do not directly make contact to any hot objects. For example, they must not make contact with chimney pipes, warm gas pipes, or other hot objects.

8) Ensure the external power cord, connection wire of the indoor and outdoor units, and the communication cords are not being squeezed. Never pull, stretch, or bend the wires.

9) The external power cord, connection wire of the indoor and outdoor units, and the communication cords must not collide with any metal beams or edges on the ceiling. They also can't touch any metal burrs or sharp metal edges.

10) Connect wires correspondingly by referring to the circuit diagram labeled on the unit or electric box. Screws must be tightened. Replace slipped screws with specialized flat-head screws.

11) Use the power cables that are delivered along with the air conditioner. Do not change the power cables arbitrarily. Do not change the length and terminals of the power cables. If you want to change the power cables, contact the local service center.

12) Connect the wiring terminals firmly to the terminal board. Loose connection is forbidden.

13) After the electrical installation is finished, use wire clamps to secure the power cord, connection wire of the indoor and outdoor units, and the communication cords. Confirm the wires are not clamped too tight.

14) Ensure the wire gauge of the power cord is large enough. Replace damaged power cords or other wires with specialized wires. Wiring work must be done according to the national wiring rules and regulations.

2.3.2. Electrical Parameters

Wire Specifications and Fuse Capacity

Model	Power Supply	Circuit Breaker Capacity	Min. Sectional Area for Power Cords
	V/Ph/Hz	A	mm²
YN009GLSI24RPG	230V~60Hz	10	1.0
YN012GLSI24RPG	230V~60Hz	16	1.5
YN018GLSI24RPG	230V~60Hz	16	1.5
YN024GLSI24RPG	230V~60Hz	25	2.5

Notes:

1) The fuse is located on the main board.

2) Install a circuit breaker near the outdoor units with at least a 0.1 in (3 mm) contact gap. Ensure the units are capable of being plugged or unplugged.

3) Circuit breaker and power cord specifications listed in the above table are determined based on the maximum power input of the units.

4) Ensure the appliance supply cords that are intended for outdoor use are not lighter than polychloroprene sheathed flexible cords (code designation 60245 IEC 57).

5) The circuit breaker specifications are based on a working condition where the working temperature is 104°F (40°C). If the working condition changes, adjust the specifications according to national standards.

6) The maximum length for wires is 98 ft (30 m). Select a proper length according to local conditions.

7) Confirm the communication cord's wire is not less than 0.75mm². It’s recommended to use 0.75mm² power cords as the communication cords.

8) Adopting the shielded wire for the communication cable between the indoor unit and centralized controller is required. After finishing the connection, the shielded layer must be reliably grounded.

2.3.3. Connection of Power Cord and Communication Cord

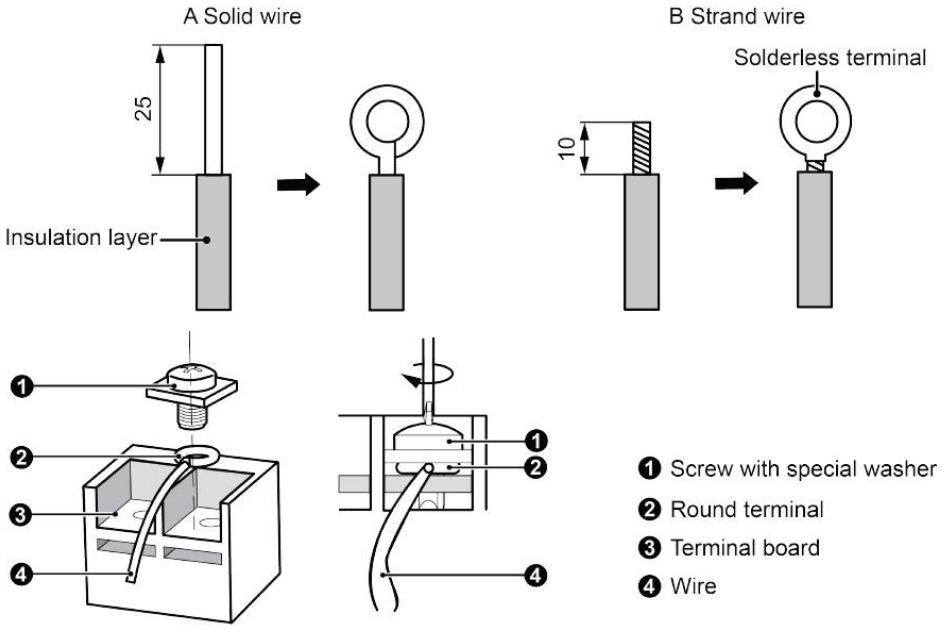
1. For Solid Wires:

1) Use wire cutters to cut off the wire end. Then peel away about 1 in (25 mm) of the insulation layer.
2) Use a screwdriver to unscrew the terminal screw on the terminal board.
3) Use nipper pliers to bend the solid wire into a ring that fits the terminal screw.
4) Form a proper ring and then put it on the terminal board. Use a screwdriver to tighten up the terminal screw.

2. For Strand Wires:

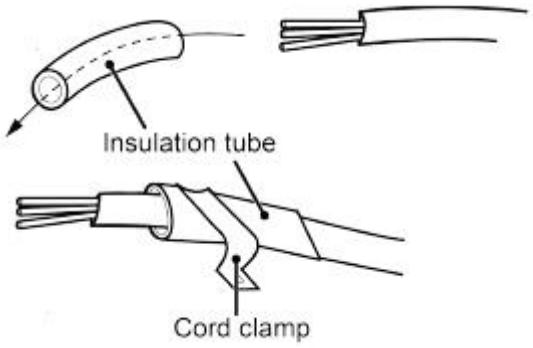
1) Use wire cutters to cut off the wire end and then peel away about 0.4 in (10 mm) of the insulation layer.
2) Use a screwdriver to unscrew the terminal screw on the terminal board.
3) Use a round terminal fastener or clamp to fix the round terminal firmly on the peeled wire end.
4) Locate the round terminal conduit. Use a screwdriver to replace it and tighten the terminal screw (as shown below).

Unit: mm



3. How to Connect the Connection Wire and Power Cord

Lead the connection wire and power cord through the insulation tube. Then fix the wires with wire clamps (as shown in the following figure).



4. Outdoor Unit Wiring

1) Select copper-cored wires.

2) With the electric control box being inside the unit body, dismantle the valve installation cover, top cover, and the right-front board when connecting the wires. Then connect the responding wires to the electrical component's hole on the right backboard.

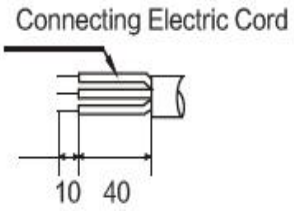
3) Wrap the electric wire (conductor), which is not inserted into the connection pole, with the PVC belt. Ensure the wire avoids any electric appliance or metal elements.

4) After installing the cable connection lug to the main power wire, connect it to the terminal row.

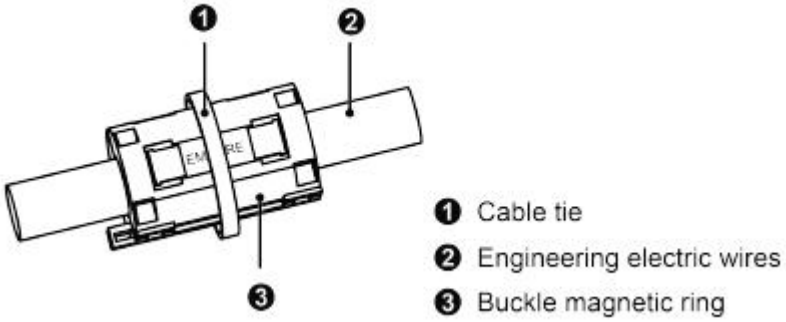
5) Install the connection lug to the grounded wire of the cables. Ensure that all cables are connected to the grounded bolt.

6) The electric wire from the terminal should be routed through the wire clips.

7) Refer to the right illustration.



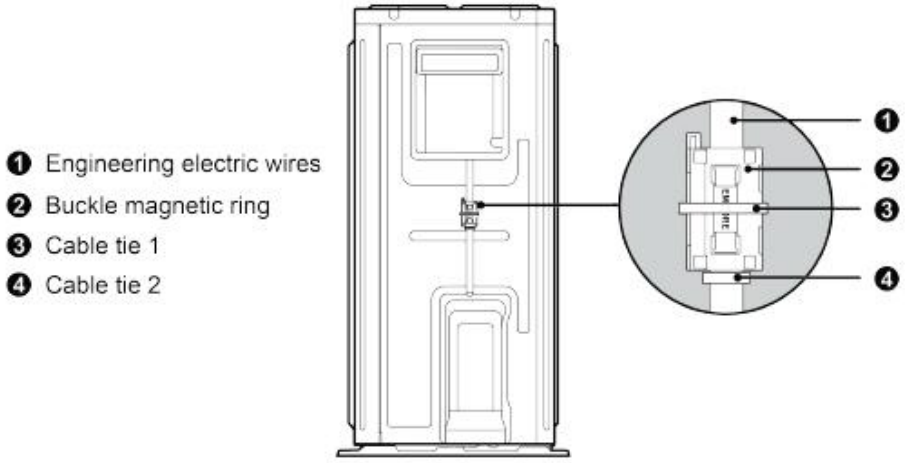
For indoor units that include buckle magnetic rings with its packaging materials, pass the engineering electric wires (live wire, neutral wire, earthing wire, and communication cable) through the buckle magnetic ring before entering them into the unit. Fix the magnetic ring reliably with the cable tie. Do not allow the engineering wires and buckle magnetic ring to touch sharp edges.



Add the buckle magnetic ring to the power line communication cord of the outdoor and indoor units. Fix the buckle magnetic ring to the outlet of the power line communication cord near the outdoor unit side. The following are detailed operation steps for the magnetic buckle:

1) Secure the buckle magnetic ring to the power line communication cord's outlet, near the outdoor unit, with a cable tie (refer to No. 4 in the picture below) to prevent it from sliding along the cord.

2) Clasp the buckle magnetic ring to the location of the power line communication cord. After, re-fix it with a cable tie (refer to No. 3 in the picture below).



Note: Ensure the indoor unit is connected correctly with the high-pressure and low-pressure stop valve of the outdoor unit as well as the signal line. Otherwise, some electrical components and the system may suffer damages.

WARNING!
1. Before working, check whether the indoor and outdoor units are powered on.
2. Match the wire colors with the circuit diagram.
3. Ensure the wire connection is correct. Wrong wire connection may burn the electrical components.
4. Connect the wires firmly to the wiring box. Incomplete installations may lead to fire hazards.
5. Use wire clamps to secure the external covers of connecting wires. (Clamp the insulators securely. Otherwise, electric leakage may occur.)
6. Connect the ground wire.

WARNING!
1. Lead the high- and low-voltage wires through the different rubber rings of the electric box cover.
2. Do not bundle or lay side-by-side the connection and communication wires of the wired control systems, as this may lead to errors.
3. Secure the high- and low-voltage wires separately. Secure the former ones with large clamps and the latter ones with small clamps.
4. Use screws to tighten the connection wires and power cords of the indoor and outdoor units on the terminal board. Wrong connection may lead to fire hazards.
5. If the connection wires of the indoor and outdoor units as well as the power cords are not correctly connected, the air conditioner may get damaged.
6. Ground the indoor and outdoor units by connecting the ground wire.
7. Ensure the units comply with applicable local and national rules and regulations on power consumption.
8. When connecting the power cord, confirm the phase sequence of the power supply matches with the corresponding terminals, as this may cause the compressor to reverse and operate abnormally.

2.4. Checks After Installation

Check these items after installation:

Check Items	Possible Events Due to Improper Installation
Is the main body installed securely?	The unit may fall down, vibrate, or produce noise
Did you complete the water leakage test?	The cooling capacity may become unsatisfactory
Is the unit well-insulated from heat?	Condensation and water drops may occur
Does water drainage operate well?	Condensation and water drops may occur
Is the voltage consistent with the value stated on the nameplate?	The unit may fail, and its components might be at risk of burning
Are the wires and pipes installed correctly?	The unit may fail, and its components might be at risk of burning
Has the unit been safely grounded?	Risk of electric leakage
Do the specifications of the wires comply with the requirements?	The unit may fail or its components might be at risk of burning
Are there any obstacles blocking the air inlet and outlet of the indoor or outdoor units?	Cooling capacity may become unsatisfactory
Have you recorded the length of the refrigerant pipe and refrigerant charging amount?	The refrigerant charging amount can’t be controlled

2.5. Test Running

Preparation before Connecting the Power:

1) If the installation is not complete, ensure the power is not connected.

2) Confirm the control circuit is correct and all the wires are firmly connected.

3) Ensure the valves of the gas pipe are cut-off and the liquid pipe is open.

4) Clean the inside of the unit. Remove irrelevant objects, if there are any.

5) After checking, reinstall the front side plate.

Operation after Connecting the Power:

1) If all the above work is finished, power on the unit.

2) Confirm the indoor and outdoor units can run normally.

3) Feel the air flow of the indoor unit to confirm it's normal.

4) See if the fan can run normally by pressing the swing button or speed control button on the remote control or wired control.

Notes:

1. If you use the remote control to turn off the unit and then immediately turn the unit on again, the compressor will take 3 min to restart. Even if you press the "On/Off" button on the remote control, it won't start up right away.

2. If there's no display on the wired control, it's probably because the connection wire between the indoor unit and wired control is not connected. Check again.

3. Maintenance Instruction Manual

3.1. Servicing Information

This manual contains specific information for personnel who are servicing an appliance that employs a flammable refrigerant.

1. Checks to the Area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure the risk of ignition is minimized. For repairing refrigerating systems, comply with the following precautions prior to conducting work on the system.

2. Work Procedure

Utilize a controlled procedure when working on the appliance in order to minimize the risk of a flammable gas or vapor from being present.

3. General Work Area

Maintenance staff and others working in the local area must be instructed on the nature of work being carried out. Avoid working in confined spaces. Section off the area around the work space, ensuring the conditions within the area have been made safe, including the control of flammable material.

4. Checking for Presence of Refrigerant

Check the area with an appropriate refrigerant detector prior and during work, ensuring the technician is aware of the potentially flammable atmospheres. Confirm the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

5. Presence of Fire Extinguisher
If conducting hot work on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment must be available. Keep a dry powder or co2 fire extinguisher adjacent to the charging area.

6. No Ignition Sources
Do not use any ignition sources when conducting work on refrigeration systems involving piping that contains or contained flammable refrigerant. This may lead to the risk of fires or explosions. If flammable refrigerant is possibly released to the surrounding space, all possible ignition sources, including cigarette smoking, must be kept sufficiently away from the work site. Prior to work, survey the area around the equipment to ensure there are no flammable hazards or ignition risks. No Smoking signs must be displayed.

7. Ventilated Area
Ensure the area is open or well-ventilated before breaking into the system or conducting any hot work. A degree of ventilation should continue while work is being carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

8. Checks to the Refrigeration Equipment
When they're being changed, they must be fit for the purpose and to the correct specification. Follow the manufacturer's maintenance and service guidelines at all times. If in doubt, consult with the manufacturer's technical department for assistance.

Apply the following checks to installations using flammable refrigerants:

1) The charge size is in accordance with the room size where the refrigerant containing parts are being installed.

2) The ventilation machinery and outlets are operating adequately and not obstructed.

3) If an indirect refrigerating circuit is being used, check the secondary circuit for the presence of refrigerant.

4) Ensure the markings to the equipment continue to be visible and legible. Correct markings and signs that are illegible.

5) Install refrigeration pipes or components in a position where they are unlikely to be exposed to any substances that may corrode refrigerant containing components, unless the components are constructed of corrosion-resistant materials or are suitably protected.

9. Checks to Electrical Devices
Repairs and maintenance to electrical components must include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, disconnect the electrical supply to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution must be used. Report this to the owner of the equipment so all parties are advised.

Initial safety checks must include:

1) Ensure the capacitors are discharged (this must be done in a safe manner to avoid possibility of sparking).

2) Confirm no live electrical components and wiring are exposed while charging, recovering, or purging the system.

3) Ensure there is continuity of earth bonding.

3.2. Repairs to Sealed Components

1. During repairs to sealed components, disconnect all electrical supplies from the equipment being worked on prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply for the equipment during servicing, then a permanently operating form of leak detection must be located at the most critical point to warn of a potentially hazardous situation.

2. Pay particular attention to the following to ensure the electrical components are working and the casing has not been altered in a way that affects the level of protection. This includes damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure the apparatus is mounted securely. Ensure the seals or sealing materials have not degraded to the point they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts must be in accordance with the manufacturer's specifications.
Note: The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment.
Intrinsically safe components do not have to be isolated prior to working on them.

3.3. Repairs to Intrinsically Safe Components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that it will not exceed the permissible voltage and current for the equipment in use. You can only work on intrinsically safe components during the presence of a flammable atmosphere. The test apparatus must be at the correct rating. Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

3.4. Cabling

Ensure the cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. While checking the equipment, you must take into account the effects of aging or continual vibration from sources such as compressors or fans.

3.5. Detection of Flammable Refrigerants

While searching or detecting refrigerant leaks, do not use potential sources of ignition. Do not use a halide torch (or any other detector using a naked flame).

3.6. Removal and Evacuation

When breaking into the refrigerant circuit to make repairs or for any other purpose, conventional procedures must be used. However, it is important that the best practice is followed since flammability is a possibility. Follow this required procedure:

1) Remove refrigerant
2) Purge the circuit with inert gas
3) Evacuate
4) Purge again with inert gas
5) Open the circuit by cutting or brazing

The refrigerant charge must be recovered into the correct recovery cylinders. The system must be "flushed" with OFN to render the unit safe. You may need to repeat this process several times. Do not use compressed air or oxygen for this task.

Flushing must be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved. Then, vent to atmosphere and finally pull down to the vacuum. Repeat this process until no refrigerant is within the system. When the final OFN charge is used, the system must be vented down to atmospheric pressure, enabling the work to take place. This operation is absolutely vital if brazing operations on the pipe are taking place.

Ensure the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available.

3.7. Charging Procedures

In addition to conventional charging procedures, the following requirements must be followed:

1. Ensure the contamination of different refrigerants does not occur when using charging equipment. Hoses or lines must be as short as possible to minimize the amount of refrigerant contained in them.

2. Cylinders must be kept upright.

3. Ensure the refrigeration system is earthed prior to charging the system with refrigerant.

4. Label the system when charging is complete (if not done already).

5. Take extreme care to not overfill the refrigeration system.

6. Prior to recharging the system, it must be pressure tested with OFN. The system must be leak tested during the completion of charging but prior to commissioning. A follow-up leak test must be completed prior to leaving the site.

3.8. Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment. lt is recommended that all refrigerants are recovered safely prior to the task being carried out. An oil and refrigerant sample must be taken in case analysis is required prior to reuse of reclaimed refrigerant. lt is essential that electrical power is available before the task is commenced:

1. Become familiar with the equipment and its operation.

2. lsolate the system electrically.

3. Before attempting the procedure, ensure:
   1) Mechanical handling equipment is available (if required for handling refrigerant cylinders).
   2) All personal protective equipment is available and being used correctly.
   3) The recovery process is supervised at all times by a competent person.
   4) Recovery equipment and cylinders conform to the appropriate standards.

4. Pump down the refrigerant system, if possible.

5. If a vacuum is not available, make a manifold so the refrigerant can be removed from various parts of the system.

6. Ensure the cylinder is situated on the scales before recovery takes place.

7. Start the recovery machine and operate it in accordance with the manufacturer's instructions.

8. Do not overfill the cylinders. (No more than 80% volume liquid charge).

9. Do not exceed the maximum working pressure of the cylinder, even temporarily.

10. When the cylinders have been filled correctly and the process is complete, ensure the cylinders and equipment are removed from the site promptly and all isolation valves on the equipment are closed off.

11. Recovered refrigerant must not be charged into another refrigeration system unless it has been cleaned and checked.

3.9. Labeling

Equipment must be labeled stating that it has been de-commissioned and emptied of refrigerant. The label must be dated and signed. Ensure there are labels on the equipment stating the equipment contains flammable refrigerant.

3.10. Recovery

When removing refrigerant from system for service or decommission, it is recommended to remove all the refrigerant. When transferring refrigerant into cylinders, ensure only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders being used must be designated for the recovered refrigerant and labeled for that refrigerant (i.e. special cylinders for the recovery of refrigerant).

Cylinders must include pressure relief valves. The associated shut-off valves must be in good condition. Empty recovery cylinders must be removed from the area and, if possible, cooled before recovery occurs.

The recovery equipment must be in good condition with a set of instructions for that equipment. The instruction must include information on the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales must be available and in good condition. Hoses must include leak-free disconnect couplings that are in good condition. Before using the recovery machine, ensure it's in good condition and has been properly maintained. Ensure any associated electrical components are sealed, preventing ignition in the event of a refrigerant release. Consult the manufacturer if in doubt.

The recovered refrigerant must be returned to the refrigerant supplier in the correct recovery cylinder. The relevant Waste Transfer Notice must be arranged. Do not mix refrigerants in recovery units, especially not in the cylinders.

If compressors or compressor oils are being removed, evacuate them to an acceptable level, ensuring the flammable refrigerant does not remain within the lubricant. The evacuation process must carried out prior to returning the compressor to the suppliers.

4. Product Introduction

4.1. Control

4.1.1. Operation Mode

1. Cooling Mode

Temperature Control: 61-88°F (16-31°C), and the fan speed and louver position will automatically adjust based on the Cooling mode presets.

1). When RT-ST ≥ 33°F (0.5°C), the compressor starts up and the AC operates as customer preset.

2). When:

- **A.** RT-ST ≤ 27°F (-3°C) and the compressor keeps operating for 2 min continuously
- **B.** RT-ST ≤ 28°F (-2°C) and the compressor operates in lowest frequency for 5 min continuously
- **C.** RT-ST ≤ 30°F (-1°C) and the compressor operates in lowest frequency for 10 min continuously

The compressor stops operation.

3). Compressor Frequency Control: Based on the relation of RT and ST, as well as the changing speed of RT.

4). The compressor will also stop operating while the unit:

- **A.** Switched Off
- **B.** Under protection
- **C.** Changed to Fan mode

5). The compressor operates for a minimum of 7 min before being stopped by its programming in normal operation.

6). In the process of unit operation, once the compressor ceases, it should be a 3-min delay for the next procedure.

ODU Fan Motor Control:
1). While unit:
- **A.** Switched Off
- **B.** Under protection
- **C.** To the set temperature

After the compressor ceases, the fan motor stops operating, according to the temperature of OPT and OAT. The max delay for the motor should be less than 160s.

2). When switching the unit to Cooling mode, the ODU fan motor will delay 5s after the compressor starts up.

When ODU failure or stops for protection, the IDU operates as preset.

Anti-Frosting Protection

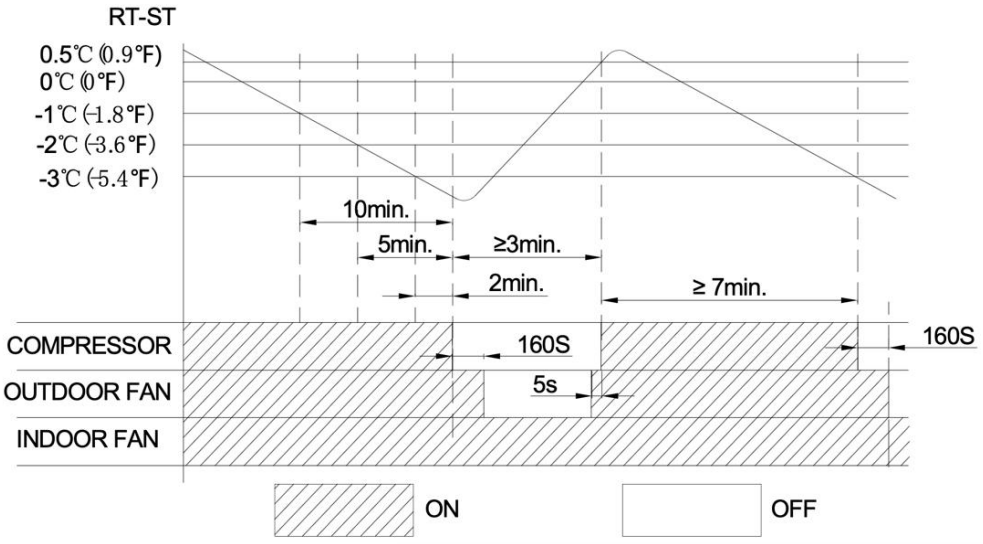
Control the unit operation frequency and the frequency changing rate to achieve anti-frosting protection.
1). Frequency Slowly Increasing (FSI):
- **A.** If 43°F (6°C) ≤ IPT < 45°F (7°C), the frequency increasing rate is 1Hz/60s, slowly increasing the operating speed.
- **B.** When IPT ≥ 45°F (7°C), the unit quits from protection.

2). Frequency Limitation:
If 41°F (5°C) ≤ IPT < 43°F (6°C), the compressor-forbidden frequency increases.

3). Normal Frequency Decreasing (NFD):
If 37°F (3°C) ≤ IPT < 39°F (4°C), the frequency decreasing rate is 8Hz/90s until the lower-frequency limit.

4). Fast Frequency Decreasing (FFD):
If 36°F (2°C) ≤ IPT < 37°F (3°C), the frequency decreasing rate is 16Hz/90s until the lower-frequency limit.

5). The unit stops:
- **A.** When IPT < 34°F (1°C) for 3 min continuously, the unit stops operating for anti-defrosting protection.
- **B.** While IPT > 43°F (6°C) and the unit stops for 3 min, the unit can be recovered to operate.



2. Heating Mode
Temperature Control: 61-88°F (16-31°C).

Compressor and Process Control:
1). When ST-CRT≥33°F (0.5°C), the compressor starts operating and the AC operates as customer preset.

2). When:

A. ST-CRT≤ 27°F (-3°C) and the compressor keeps operating for 2 min continuously
B. ST-CRT≤ 28°F (-2°C) and the compressor operates in the lowest frequency for 5 min continuously
C. RT-CRT≤ 30°F (-1°C) and the compressor operates in the lowest frequency for 10 min continuously

The compressor stops operation.
3). **Compressor Frequency Control**: Based on the relation of RT and ST, as well as the changing speed of the RT.

4). The compressor will also stop operating while the unit:

A. Switched Off
B. Under protection
C. Changed to Fan mode

5). The compressor operates for a minimum of 7 min before being stopped by is programming in normal operation.

6). In the process of unit operation, once the compressor ceases, it should be a 3-min delay for the next procedure.

IDU Time Delay:
When the compressor stops or the unit switches Off while in Heating mode, the IDU fan motor will operate for a few seconds more to prevent overheating.

ODU Fan Motor Control
1). While the unit:

A. Switched Off
B. Under protection
C. To the set temperature

After the compressor ceases, the fan motor stops operating, according to the temperature of OPT and OAT. The max delay for the motor should be less than 160s.

2). When switching the unit to Heating mode, the ODU fan motor will delay 5s after the compressor starts.

3). In the defrosting process, the fan motor will stop operating for a 48s delay after the compressor stops.

4). When defrosting finishes, the compressor stops operating and the fan motor will start operating simultaneously.

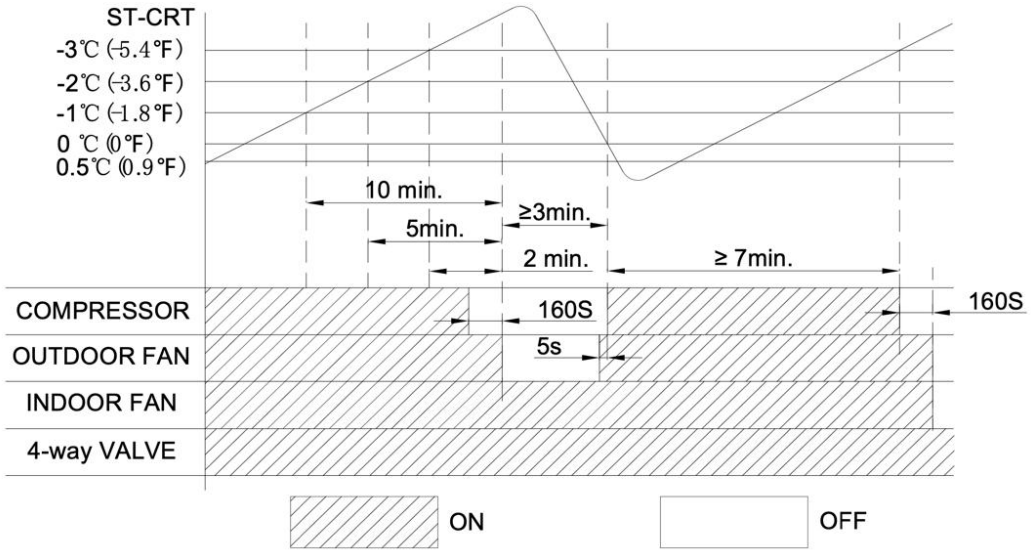
4-way Valve Control
1). In Cooling/Dry/Fan mode, the 4-way valve will be Off. When the unit switches to Heating mode, the 4-way valve will be On.

2). When Heating mode switches Off or changes from Heating to other modes, the 4-way valve will be Off for a 2-min delay after the compressor stops operating.

3). The unit stops operating due to any kind of protection, the 4-way valve will be Off a 4-min delay.

4). In the defrosting process, the 4-way valve will be Off for a 43s delay after the compressor stops.

5). When defrosting finishes, the compressor stops operating and the 4-way valve will be On after a 43s delay.



4.1.2. Control Mode

1. Based Control

Compressor Control
When Cooling or Drying mode is turned On, the indoor fan will run for a while before the compressor starts. Under different modes, the compressor can only be stopped after running for some time (special cases excluded). This is to protect the compressor from starting and stopping frequently. Once the compressor stops, it must not be restarted right away. Wait a few minutes.

Remote Controller Display
Meaning of symbols on the liquid crystal display:

No.	Symbols	Meaning
1		Battery indicator
2		Auto mode
3		Cooling mode
4		Dry mode
5		Fan Only mode
6		Heating mode

7	ECO	Eco mode
8		Timer
9	88°E	Temperature indicator
10		Fan speed: Auto / Low / Low-Mid / Mid / Mid-High / High
11		Mute function
12		Turbo function
13		Up-down auto swing
14		Left-right auto swing
15		Sleep function
16		I Feel function
17	8H	46°F (8°C) Heating function
18		Signal indicator
19		Child-Lock
20		Display On/Off
21		Self-Clean function

No.	Button	Function
1		Turn On/Off the air conditioner.
2	^	Increase the temperature or Timer setting hours.
3	ˇ	Decrease the temperature or Timer setting hours.
4	MODE	Select the mode of operation (Auto, Cool, Dry, Fan, and Heat).
5	ECO	Activate/deactivate the Eco function.
		Long press to activate/deactivate the 46°F (8°C) heating function (Depending on certain models).
6	TURBO	Activate/deactivate the Turbo function.
7	FAN	Select the fan speed: Auto / Mute / Low / Low-Mid / Mid / Mid-High / High / Turbo.
8	TIMER	Set the duration for the timer.
9	SLEEP	Switch On/Off the Sleep function.
10	DISPLAY	Switch On/Off the LED display.
11		Start/stop the horizontal flaps louver movement or set the desired up/ down air flow direction.

12		Start/stop the vertical deflectors louver movement or set the desired left/right air flow direction.
13	I FEEL	Switch On/Off the I Feel function.
14	MUTE	Switch On/Off the Mute function.
		Long press to activate/deactivate the Gen function (depending on certain models).
15	MODE + TIMER	Activate/deactivate the Child-Lock function.
16	CLEAN	Activate/deactivate the Self-Clean function (depending on certain models).
17	MEMORY	Memorize your desired setting temperature, setting mode, and setting fan speed.
18	ACC	/

2. Special Control

Oil Return Control
If the unit is running at low frequency for a long time, the system will enable Oil Return control. This function leads oil in the pipeline back to the compressor so it will not run out of oil. Generally, the oil return takes about 5 min. The compressor running frequency will be increased to the preset oil return frequency.

Overload Protection Function
Overload protection function for Cooling and Dehumidification mode.

Motor Overload Protection and Over-Current Protection: When the motor's load exceeds its capacity, the temperature increases and the motor current exceeds the rated value. The value of overload protection is far below the value of over-current protection, but it prevents device overload, which differs from a normal load.

Protection Control
When IPM temperature T_{IPM} ≥ 188.6°F (87°C), the compressor's frequency will be limited/reduced for IPM over-temperature protection.

When T_{IPM} ≥ 203°F (95°C), the AC unit stops operating for AC system protection.

If T_{IPM} < 188.6°F (87°C) and after the compressor stops for 3 min, the unit can be started.

If the unit has entered IPM over-temperature stop-working protection 6 times consecutively, the protection can't be recovered unless pressing the On/Off button. The unit will show a failure code.

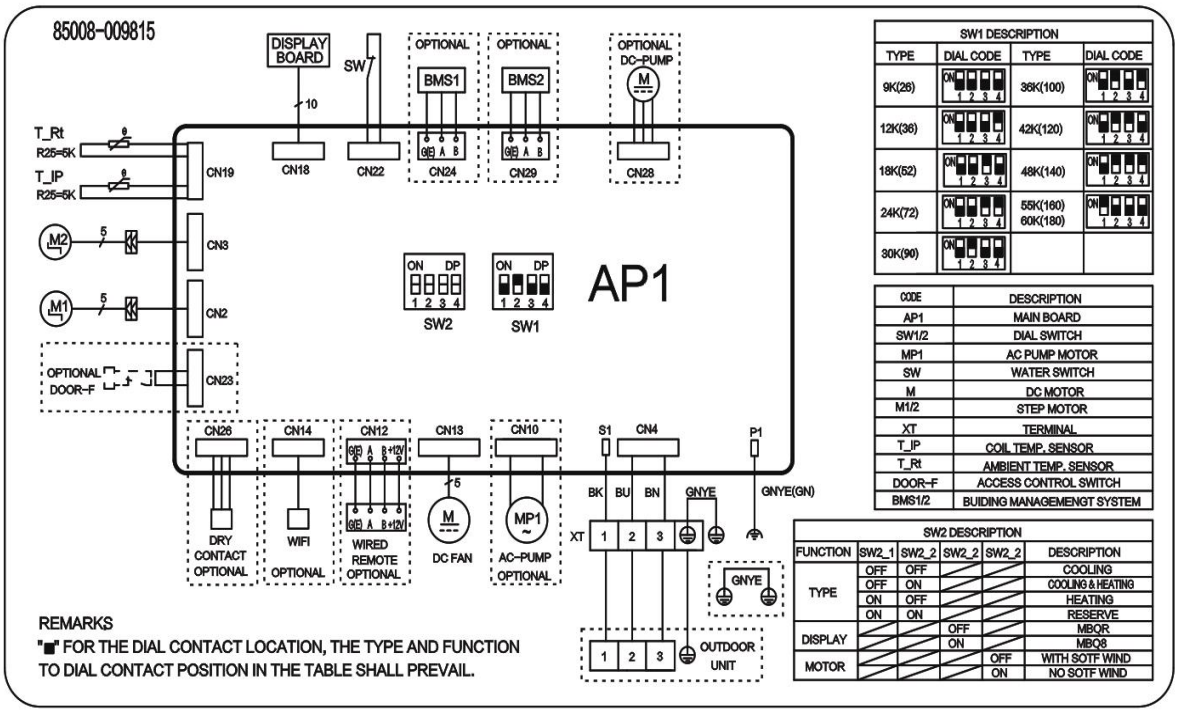
Once the compressor runs more than 6 min continuously, the counter of the overload stop-working protection will be reset to zero, restarting the counting process. The failure and times for protection will eliminate immediately once the unit is switched Off or changed to Fan mode.

Note: If the defective failure can’t be recovered, the failure can’t be eliminated even if the operation mode changes.

4.2. Wiring Diagrams

Indoor Units

Model numbers: CT009GLSILCFHG | CT012GLSILCFHG

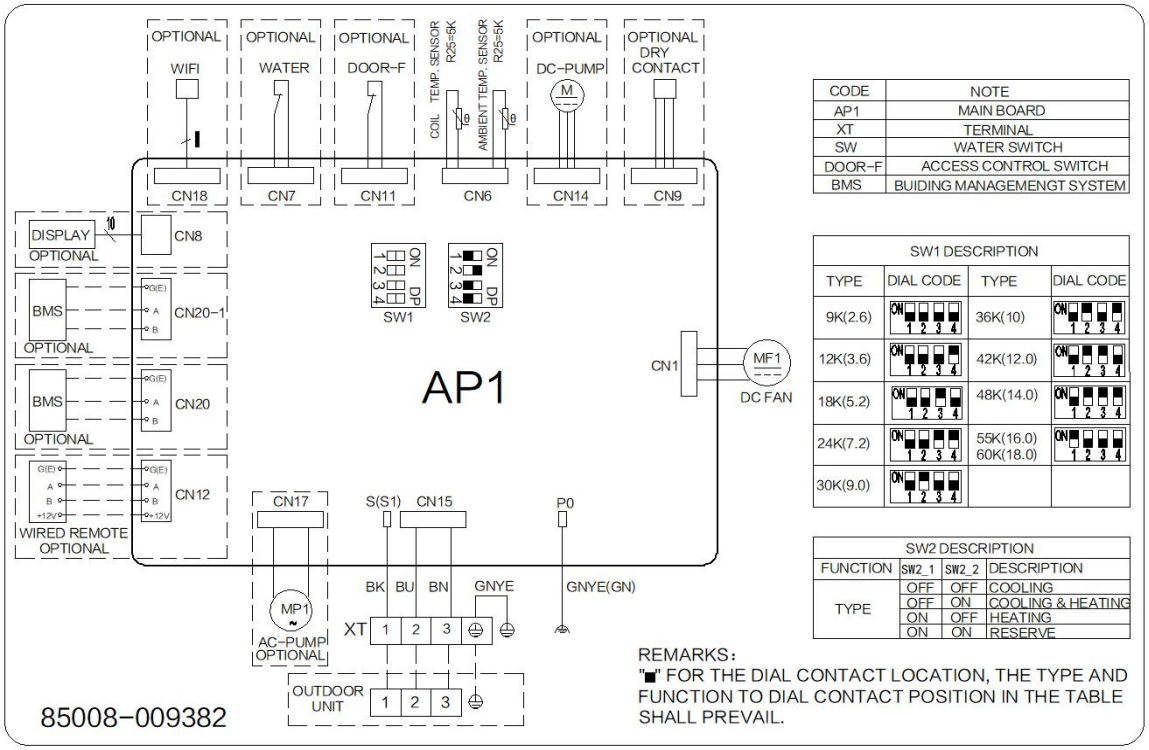


SW1 DESCRIPTION			
TYPE	DIAL CODE	TYPE	DIAL CODE
9K(26)		36K(100)	
12K(36)		42K(120)	
18K(52)		48K(140)	
24K(72)		55K(160) 60K(180)	
30K(90)			

CODE	DESCRIPTION
AP1	MAIN BOARD
SW1/2	DIAL SWITCH
MP1	AC PUMP MOTOR
SW	WATER SWITCH
M	DC MOTOR
M1/2	STEP MOTOR
XT	TERMINAL
T_IP	COIL TEMP. SENSOR
T_Rt	AMBIENT TEMP. SENSOR
DOOR-F	ACCESS CONTROL SWITCH
BMS1/2	BUIDING MANAGEMENGT SYSTEM

SW2 DESCRIPTION					
FUNCTION	SW2_1	SW2_2	SW2_2	SW2_2	DESCRIPTION
TYPE	OFF	OFF			COOLING
	OFF	ON			COOLING & HEATING
	ON	OFF			HEATING
	ON	ON			RESERVE
DISPLAY			OFF		MBQR
			ON		MBQ8
MOTOR				OFF	WITH SOTF WIND
				ON	NO SOTF WIND

Model numbers: CT018GLSILCFHG | CT024GLSILCFHG



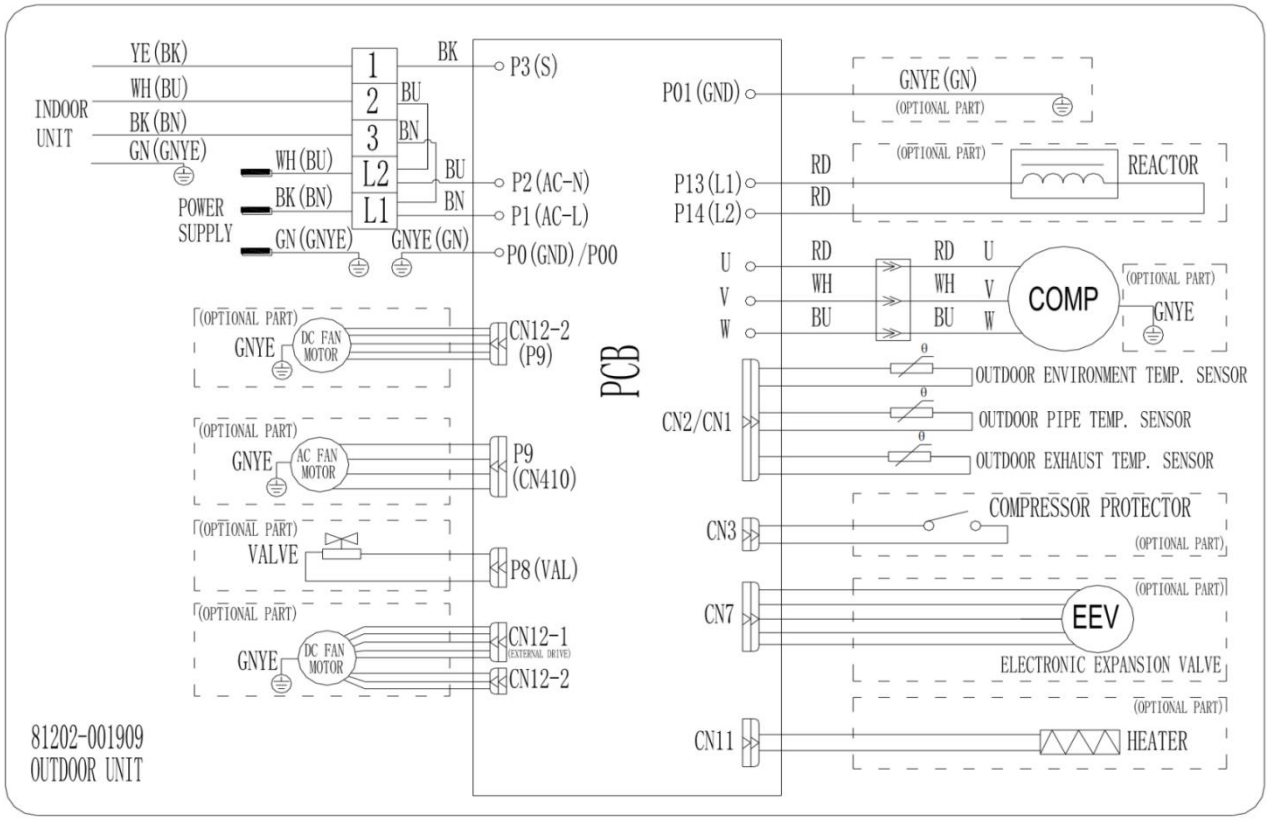
CODE	NOTE
AP1	MAIN BOARD
XT	TERMINAL
SW	WATER SWITCH
DOOR-F	ACCESS CONTROL SWITCH
BMS	BUIDING MANAGEMENGT SYSTEM

SW1 DESCRIPTION			
TYPE	DIAL CODE	TYPE	DIAL CODE
9K(2.6)		36K(10)	
12K(3.6)		42K(12.0)	
18K(5.2)		48K(14.0)	
24K(7.2)		55K(16.0) 60K(18.0)	
30K(9.0)			

SW2 DESCRIPTION			
FUNCTION	SW2_1	SW2_2	DESCRIPTION
TYPE	OFF	OFF	COOLING
	OFF	ON	COOLING & HEATING
	ON	OFF	HEATING
	ON	ON	RESERVE

Outdoor Units

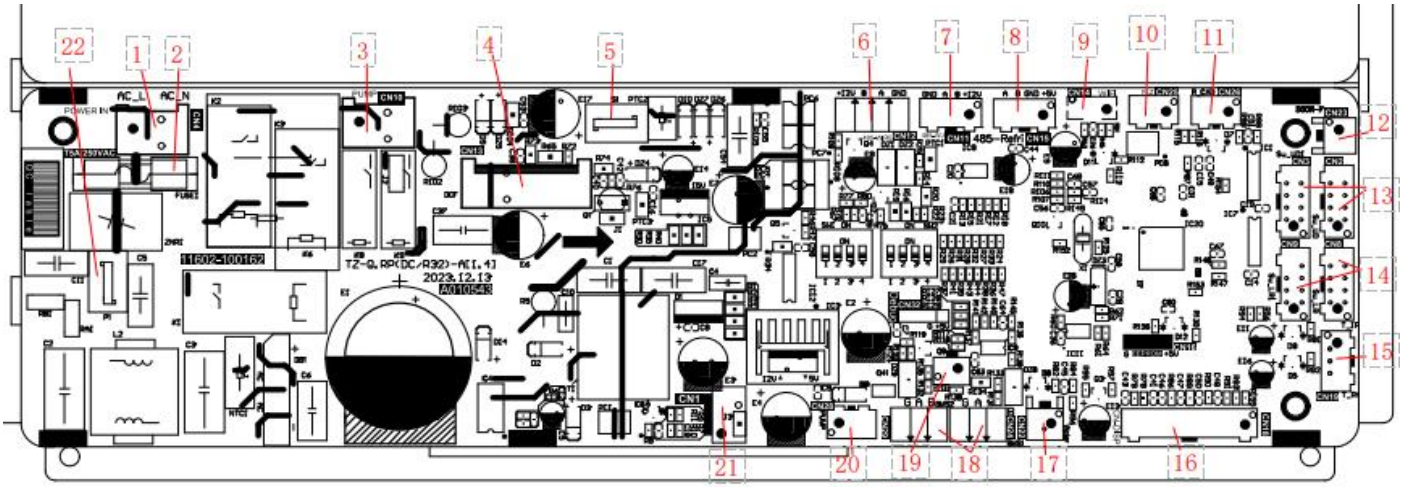
Model numbers: YN009GLSI24RPG | YN012GLSI24RPG | YN018GLSI24RPG | YN024GLSI24RPG



4.3. PCB Layout

Indoor Units:

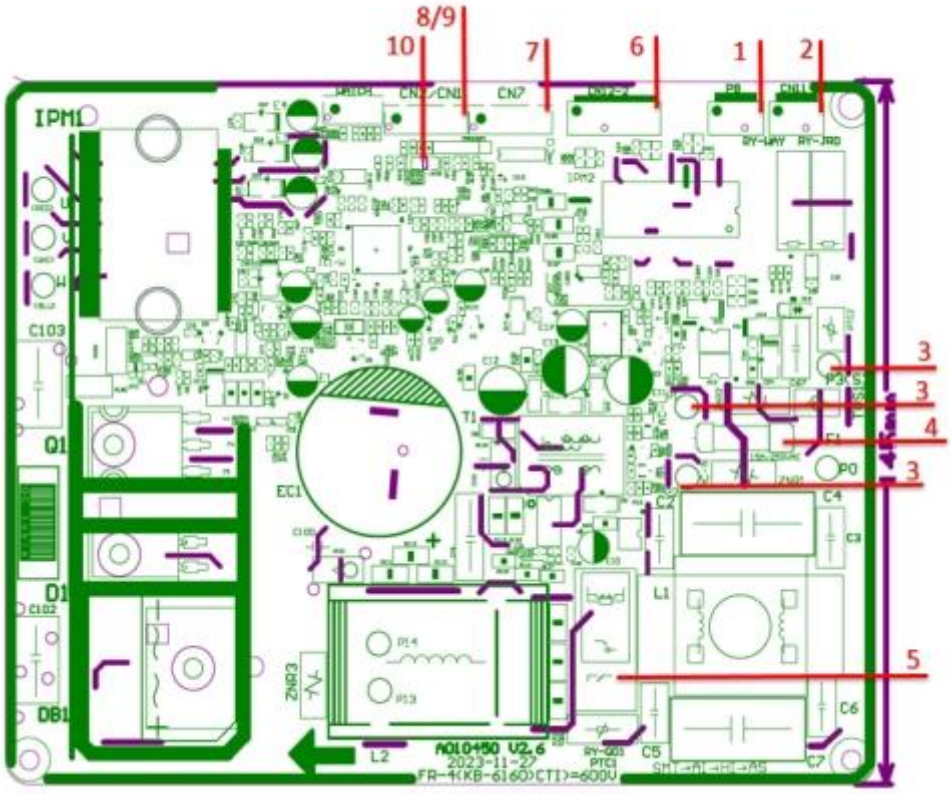
Model numbers: CT009GLSILCFHG | CT012GLSILCFHG | CT018GLSILCFHG | CT024GLSILSFHG



1	Power supply and L, N connector	13	Up-down swing connector
2	Fuse	14	Left-right swing connector
3	Water pump (AC motor) connector	15	Temperature sensor connector
4	DC fan motor connector	16	Display
5	IDU/ODU communication connector	17	Water level test
6	Wired control connector	18	VRF communication port
7	RS485 communication port	19	Jump cap
8	Refrigerant sensor connector	20	Water pump (DC motor) connector
9	Wi-Fi connector	21	E-heater thermostat
10	Anion connector	22	Earth

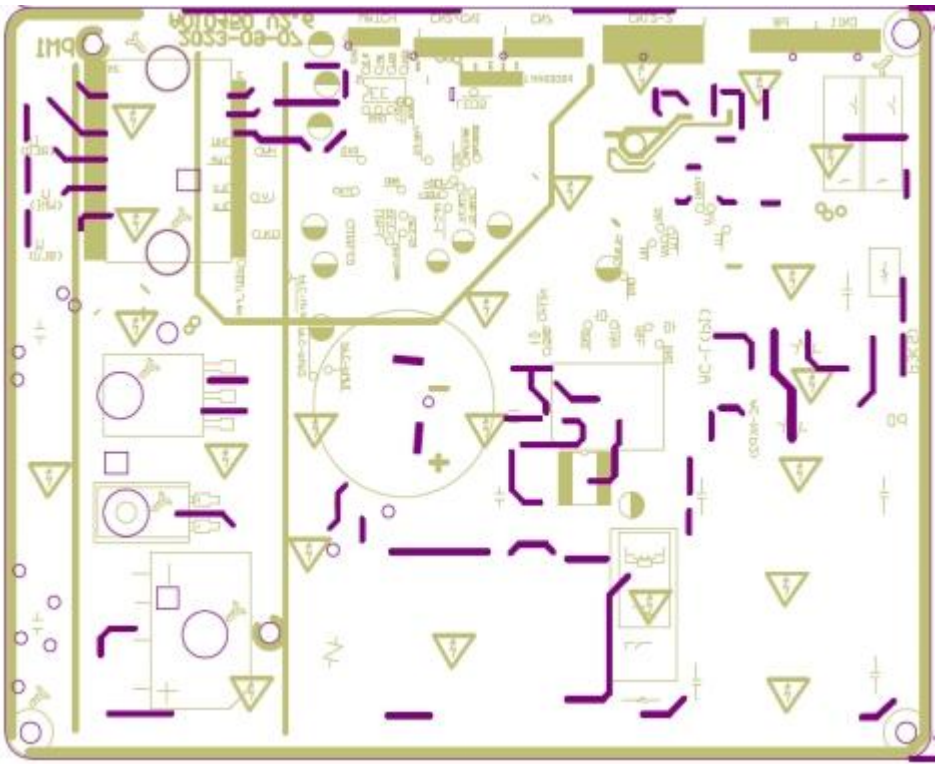
Outdoor Units
Model numbers: YN009GLSI24RPG | YN012GLSI24RPG

Top view



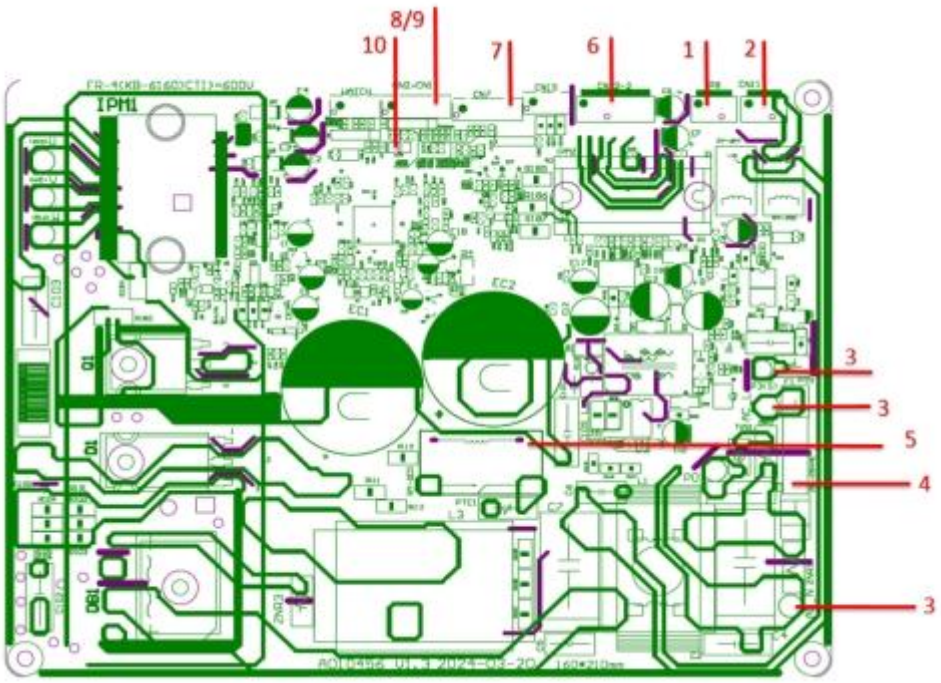
1	4-way valve
2	Heater
3	L, N and communication
4	Fuse
5	ODU PCB main relay
6	DC motor connector
7	Electronic expansion valve
8	Discharge sensor connector
9	OAT/OPT sensor connector
10	LED5

Bottom view



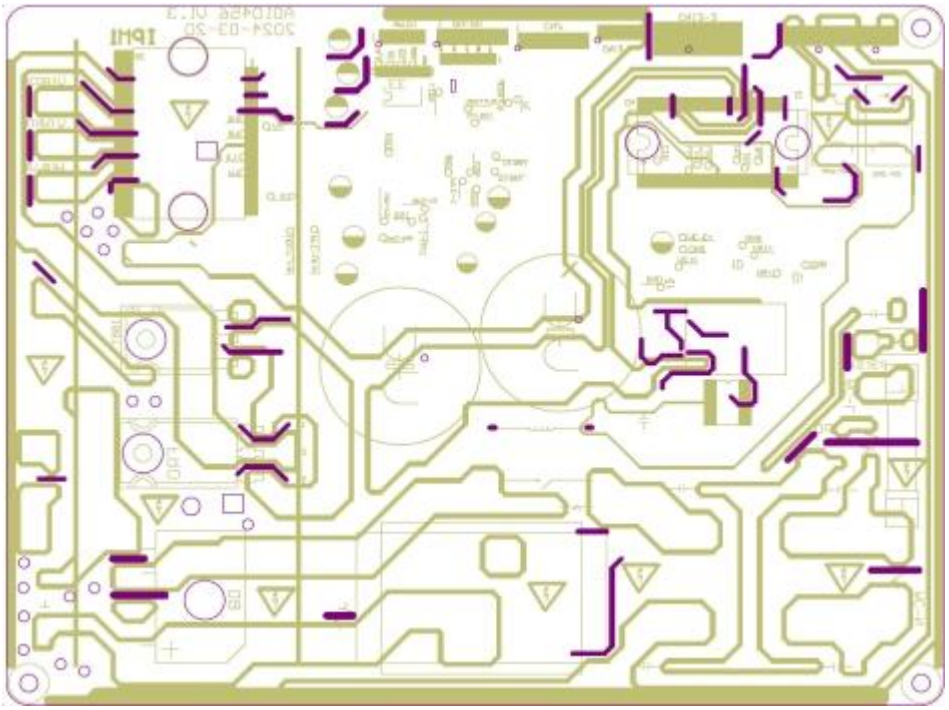
Model numbers: YN018GLSI24RPG

Top view



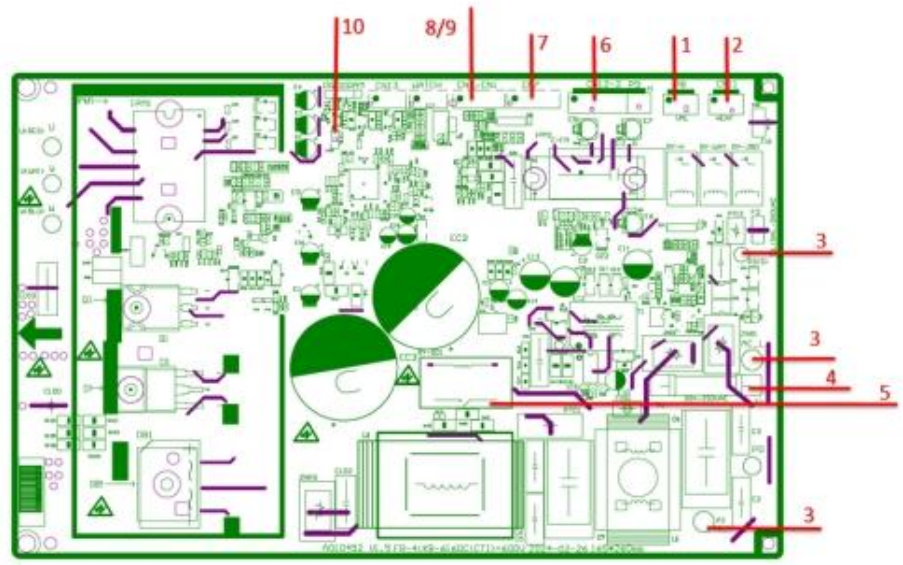
1	4-way valve
2	Heater
3	L, N and communication
4	Fuse
5	ODU PCB main relay
6	DC motor connector
7	Electronic expansion valve
8	Discharge sensor connector
9	OAT/OPT sensor connector
10	LED5
11	4-way valve
12	Heater
13	L, N and communication

Bottom view



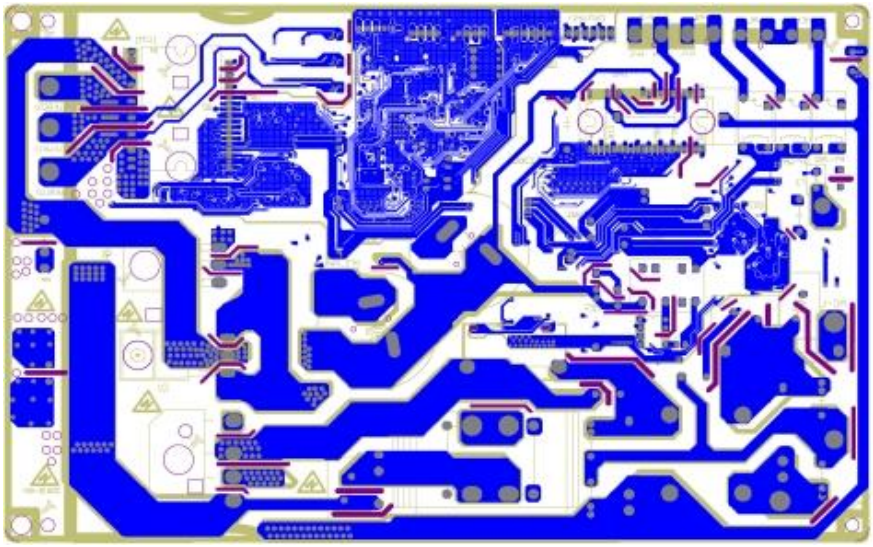
Model numbers: YN024GLSI24RPG

Top view



1	4-way valve P8
2	Heater CN11
3	L, N and communication
4	Fuse 1
5	ODU PCB main relay RY-QD1
6	DC motor connector CN12-2
7	Electronic expansion valve CN7
8	Discharge sensor connector CN2
9	OAT/OPT sensor connector CN1
10	LED 5
11	AC motor connector P9
12	LED1-LED4

Bottom view



Note:

OAT: Outdoor Ambient Temperature

OPT: Outdoor pipe temperature

5. Troubleshooting

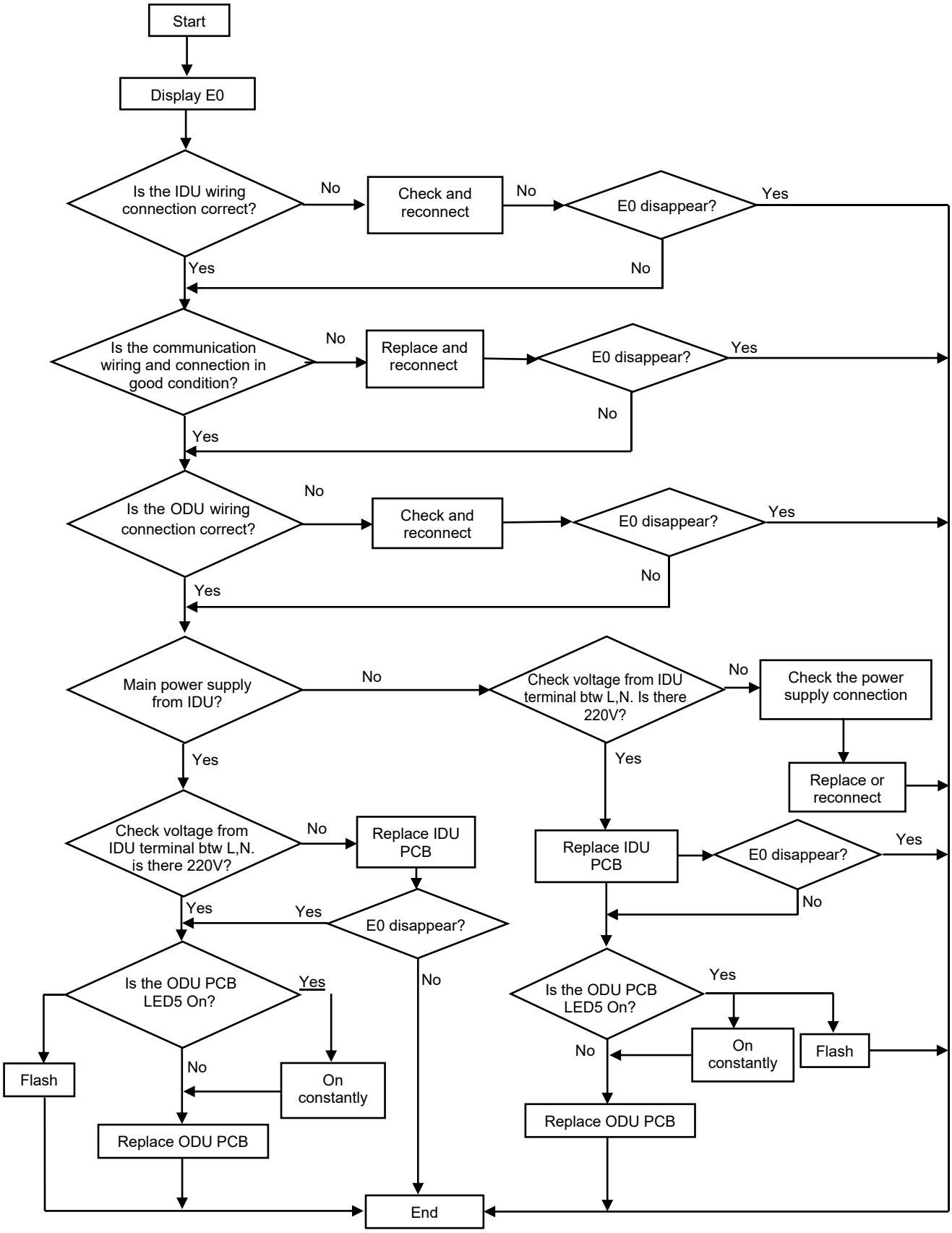
5.1. Error Codes

Code	Reason	Remark
E0	IDU and ODU communication failure	Is the IDU and ODU wiring connection correct?
E1	IDU room temperature sensor failure (IDU RT failure)	IDU sensor and PCB
E2	IDU coil temperature sensor failure (IDU IPT failure)	IDU sensor and PCB
E3	ODU coil temperature sensor failure (OPT)	ODU coil sensor and ODU PCB
E4	AC-cooling system abnormal	Gas leakage? 2-way or 3-way valve blocked, etc.
E5	IDU/ODU mismatched failure (Specific performance test on the production line)	/
E6	IDU PG fan motor / DC fan motor works abnormal (IDU failure)	Fan motor, fan blade, and PCB
E7	ODU ambient-temperature sensor failure	ODU ambient sensor and ODU PCB
E8	ODU discharge-temperature sensor failure	ODU discharge sensor and ODU PCB
E9	IPM / Compressor driving control abnormal	ODU PCB, compressor, etc.
EA	ODU current test circuit failure	Is the ODU PCB broken?
Eb	The communication abnormal of main PCB and display board (IDU failure)	Display board and main PCB
EE	ODU EEPROM failure	1. Is the ODU PCB broken? 2. Try to re-power On AC unit
EF	ODU DC fan motor failure	Fan motor and ODU PCB
EU	ODU voltage test circuit abnormal	ODU PCB
P0	IPM module protection	ODU PCB
P1	Over / Under-voltage protection	1. Is the ODU PCB broken? 2. Is the power supply abnormal?
P2	Over-current protection	1. Is the ODU PCB broken? 2. Is the power supply abnormal?
P4	ODU discharge pipe over-temperature protection	Check the troubleshooting for details
P5	Sub-cooling protection in Cooling mode	Check the troubleshooting for details
P6	Overheating protection in Cooling mode	Check the troubleshooting for details
P7	Overheating protection in Heating mode	Check the troubleshooting for details
P8	Outdoor over/under-temperature protection	Check the troubleshooting for details
P9	Compressor driving protection (Load abnormal)	Check the troubleshooting for details
PA	Communication failure for TOP flow unit / Preset mode conflict (IDU failure)	Check the troubleshooting for details

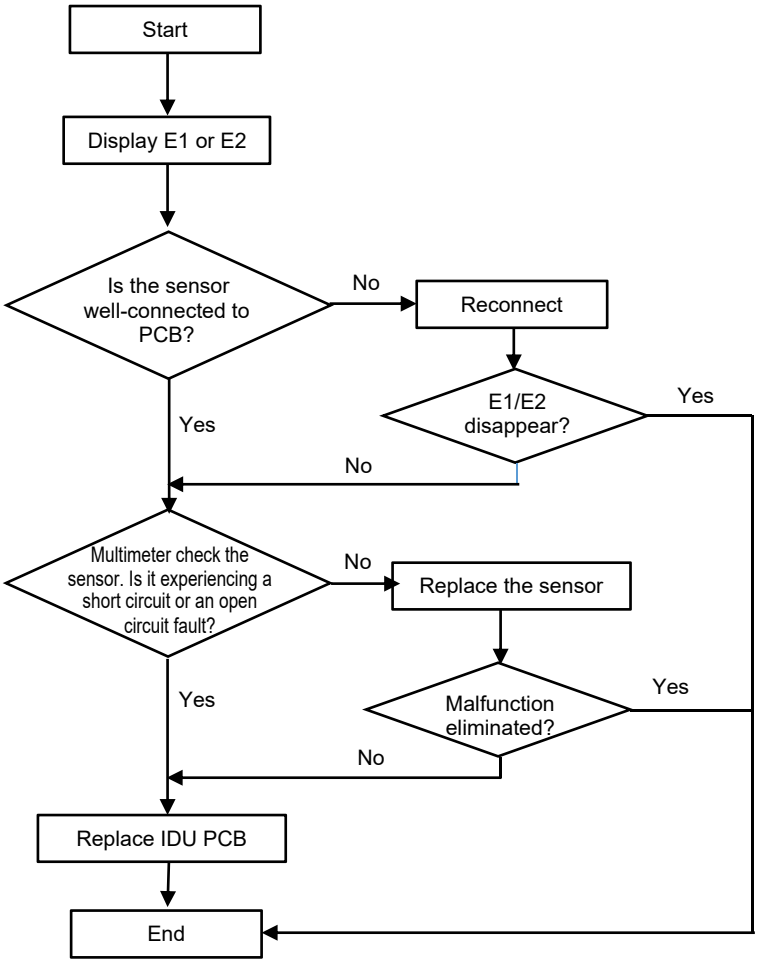
F0	Infrared customer feeling test sensor failure (IDU failure)	Query by pressing the remote controller
F1	Electric power test module failure (IDU failure)	Query by pressing the remote controller
F2	Discharge temperature sensor failure protection	Check the troubleshooting for details
F3	ODU coil temperature failure protection	Check the troubleshooting for details
F4	Cooling system gas flow abnormal protection	Check the troubleshooting for details
F5	PFC protection	Check the troubleshooting for details
F6	Compressor lack of phase / Anti-phase protection	Check the troubleshooting for details
F7	IPM module temperature protection	Check the troubleshooting for details
F8	4-way value reversing abnormal	Check the troubleshooting for details
F9	The module temperature test circuit failure	ODU PCB
FA	The compressor phase-current test circuit failure	ODU PCB
Fb	Limiting/Reducing frequency for overload protection on Cooling/Heating mode	Query by pressing the remote controller
FC	Limiting/Reducing frequency for high power consumption protection	Query by pressing the remote controller
FE	Limiting/Reducing frequency for module current protection (phase current of compressor)	Query by pressing the remote controller
FF	Limiting/Reducing frequency for module temperature protection	Query by pressing the remote controller
FH	Limiting/Reducing frequency for compressor driving protection	Query by pressing the remote controller
FP	Limiting/Reducing frequency for anti-condensation protection	Query by pressing the remote controller
FU	Limiting/Reducing frequency for anti-frost protection	Query by pressing the remote controller
Fj	Limiting/Reducing frequency for discharge over temperature protection	Query by pressing the remote controller
Fn	Limiting/Reducing frequency for ODU AC-current protection	Query by pressing the remote controller
Fy	Gas leakage protection	Check the troubleshooting for details
bf	TVOC sensor failure (IDU failure, optional)	Query by pressing the remote controller
bc	PM2.5 sensor failure (IDU failure, optional)	Query by pressing the remote controller
bj	Humidity sensor failure (IDU failure)	Query by pressing the remote controller
Fd	Refrigerant detector failure	Refrigerant detector failure or PCB is not receiving a response from the refrigerant detector
Hd	Refrigerant leakage protection	The detector detects refrigerant leakage

5.2. Troubleshooting Flow Charts

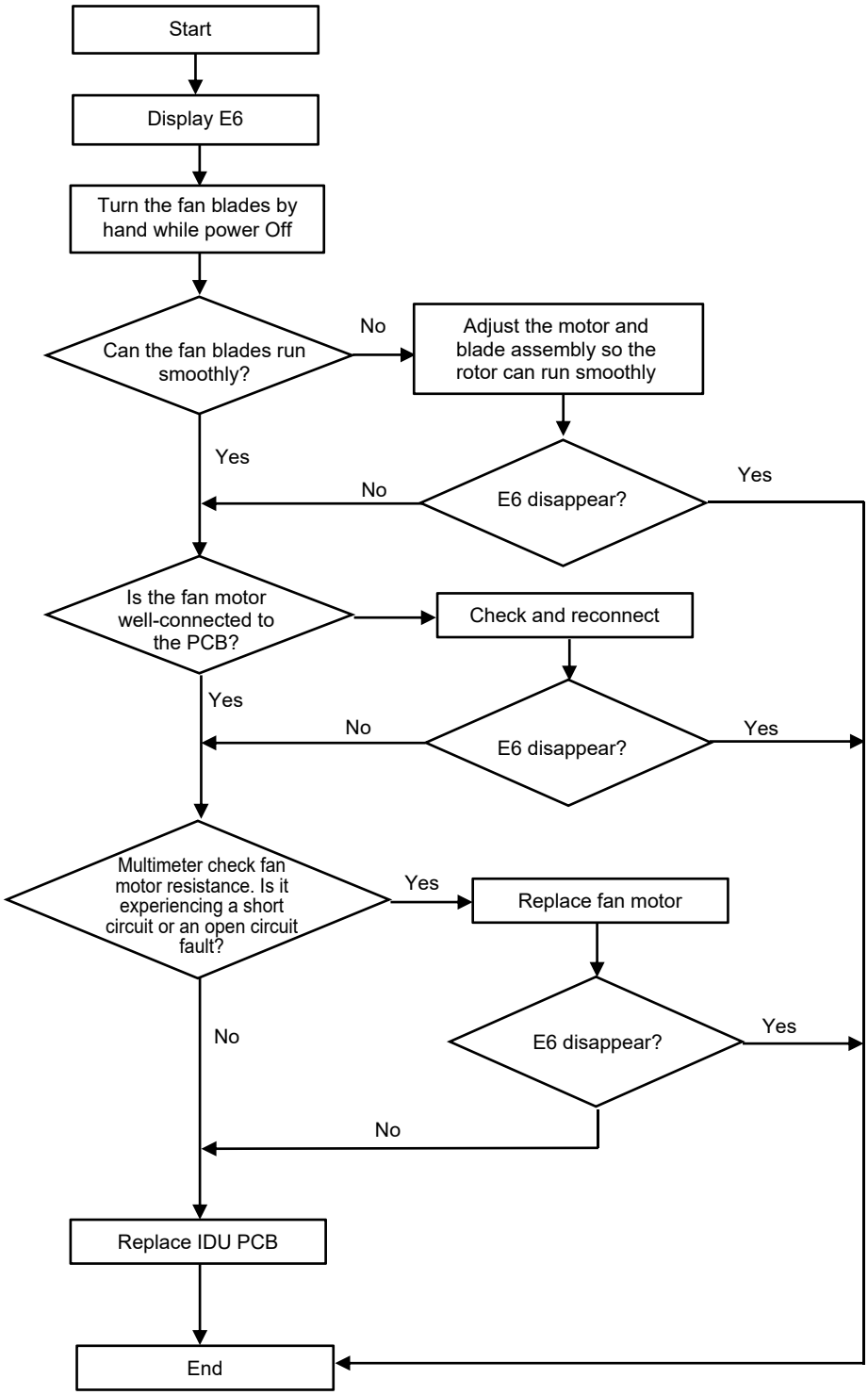
E0 --- IDU and ODU Communication Failure



E1 and E2 --- IDU Room Temperature Sensor and/or Coil Temperature Sensor Failure

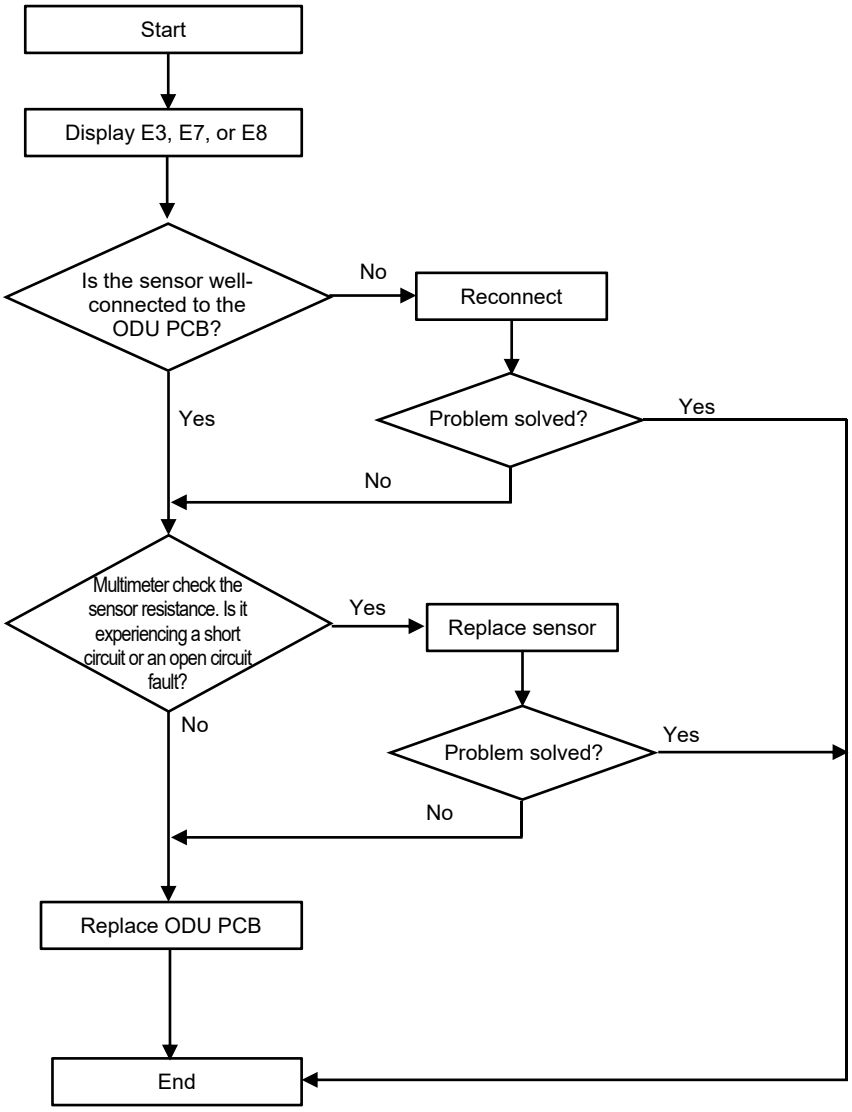


E6 --- IDU Ventilation Failure (PG and DC Fan Motor Only)



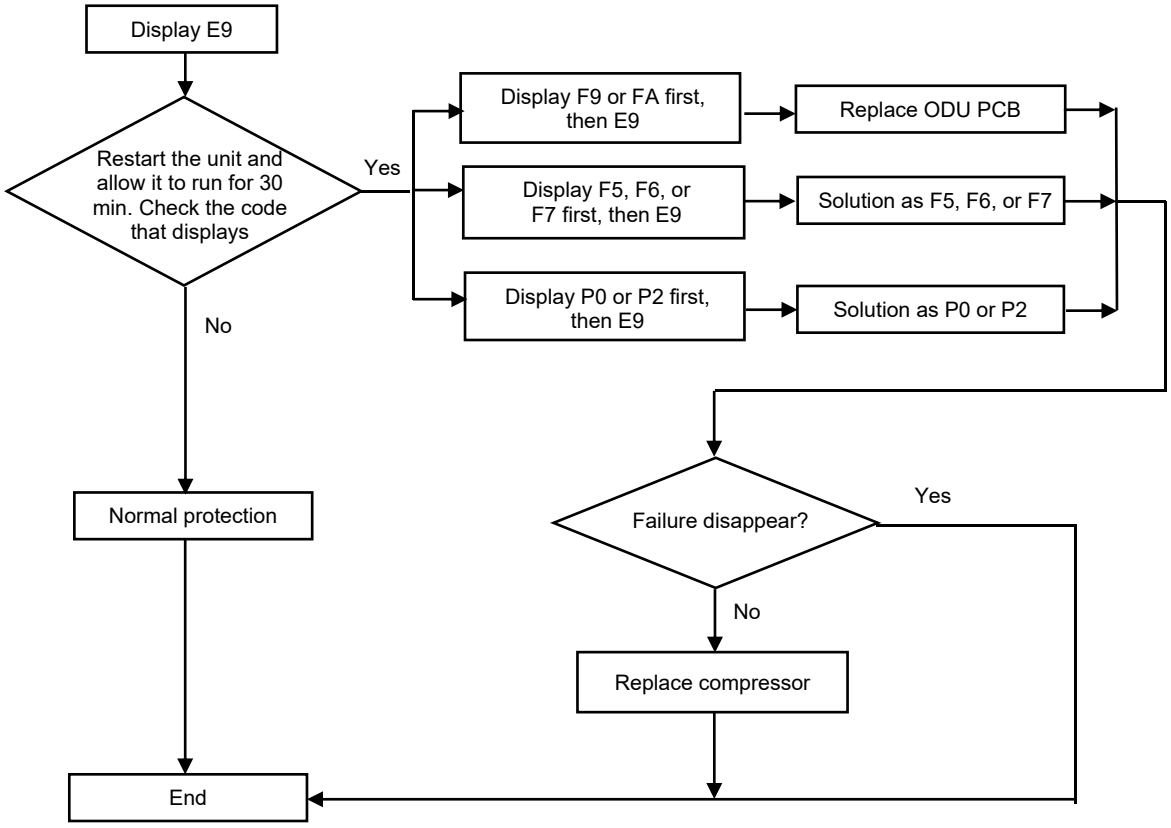
E3, E7, or E8 --- ODU Coil Temperature Sensor, Ambient Temperature Sensor, or Discharge Temperature Sensor Failure

If any of the sensors resistances experience a short circuit or an open circuit fault, the unit will display error codes as "E3", "E7", or "E8". The IDU and ODU turns Off. When the sensor resistance recovers, the unit reverts to standby. The customer can switch On the unit directly.



E9 --- ODU IPM / Compressor Drive Fault

If the unit stops working for IPM protection 6 times consecutively, it will display the "E9" error code. The unit can't be recovered to operation, except by pressing the On/Off button.



Remark:

1. F9 code

Reason: The IPM module temperature test circuit failure.

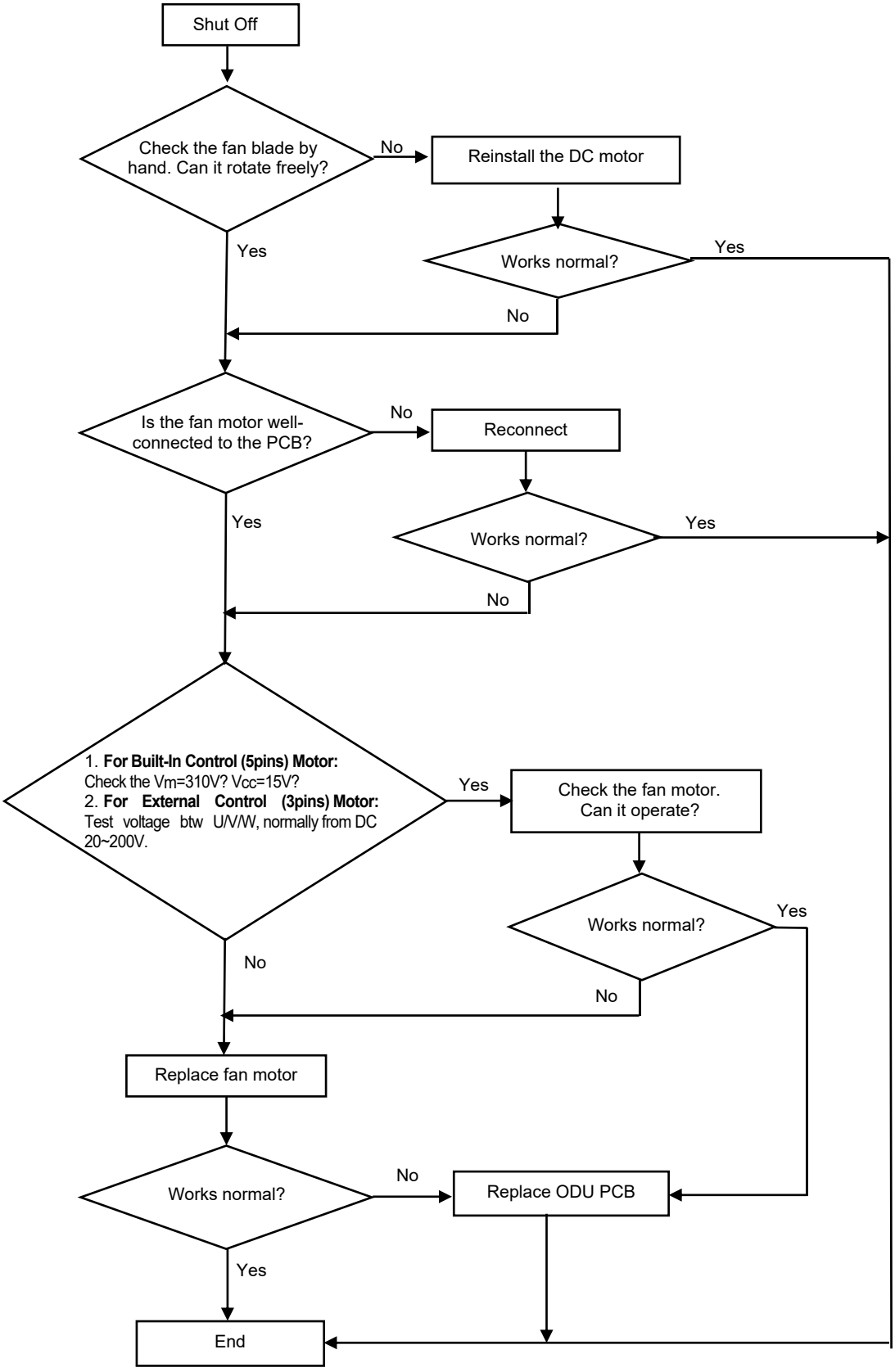
Solution: Replace the ODU PCB.

2. FA code

Reason: The compressor phase-current test circuit failure.

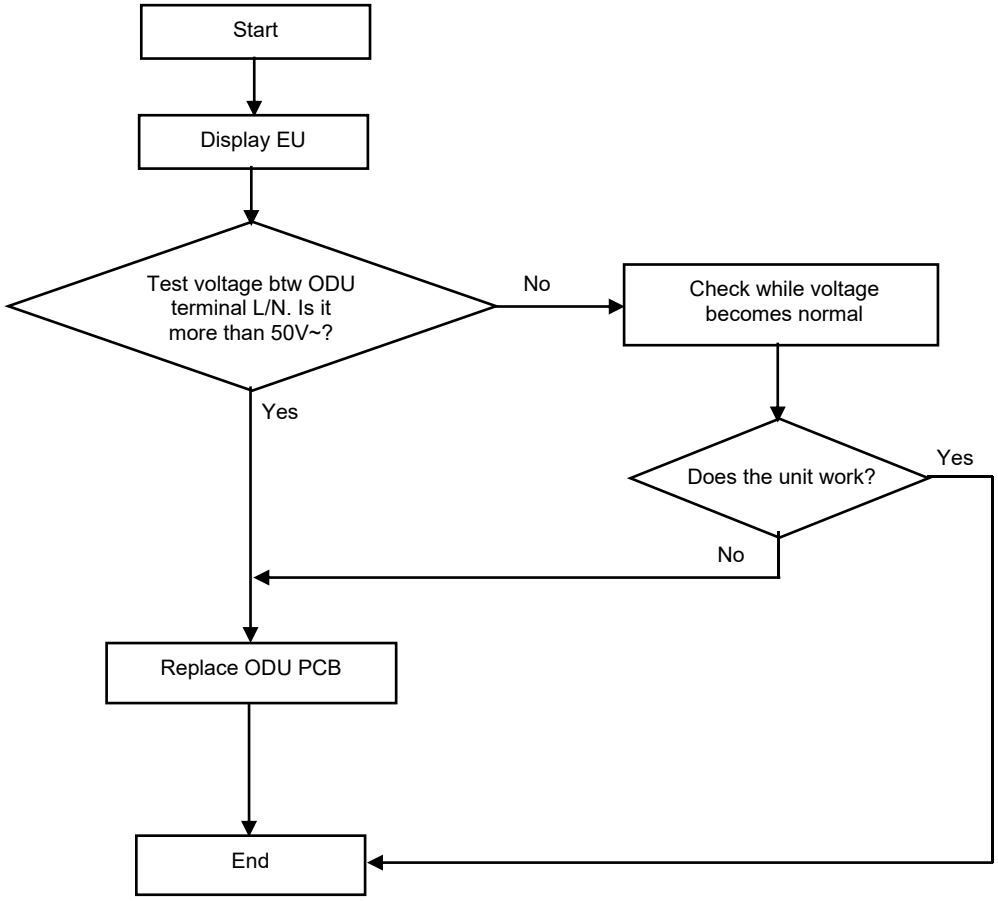
Solution: Replace the ODU PCB.

EF --- ODU DC Fan Motor Failure



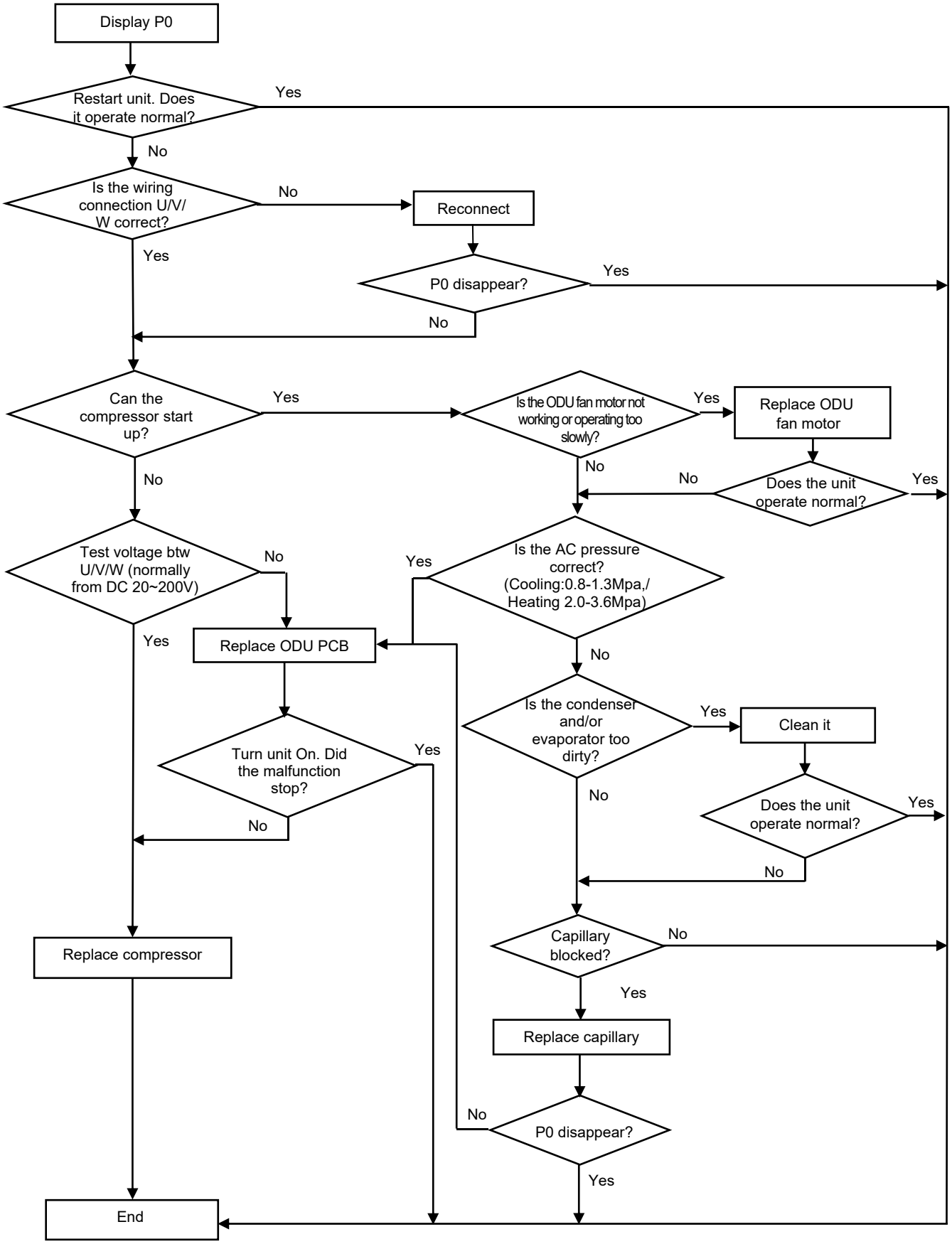
EU --- ODU Voltage Test Sensor Failure

After the power relay works, if the tested effective voltage is less than 50V for 3s continuously, the unit will display the “EU” error code.



P0 --- IPM Protection

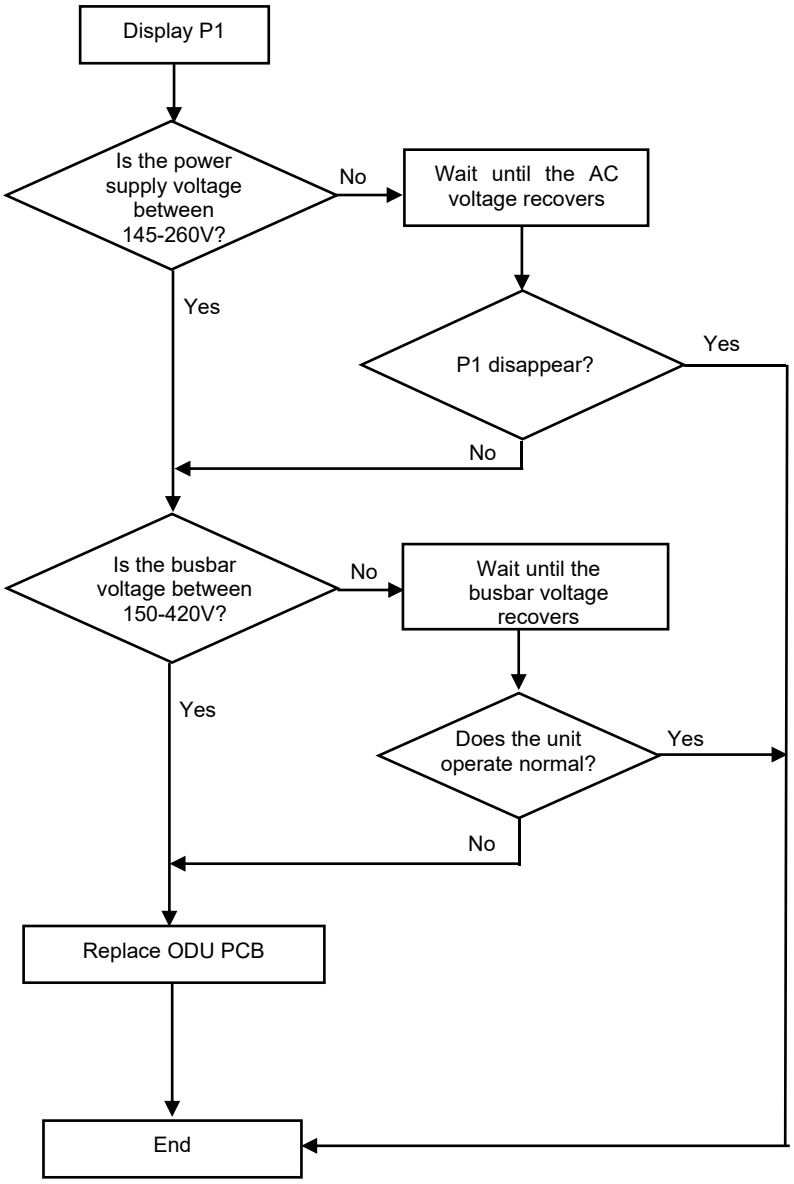
If the IPM is experiencing overheating or over-current conditions, the AC unit will display the "P0" error code.



P1 --- Over / Under-Voltage Protection

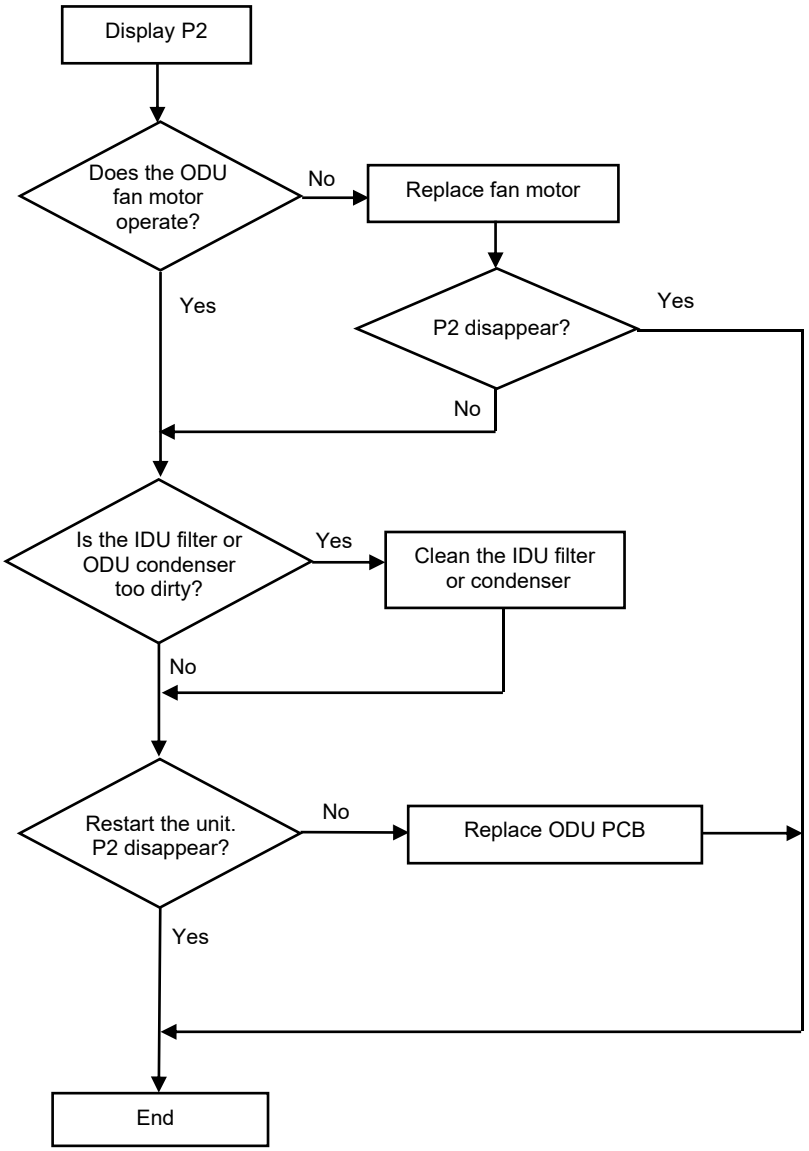
1. Test voltage between L and N. When the power supply V > AC260V or V < AC150V, the AC will display the "P1" error code. The unit will recover back to the previous status while V > AC155V.

2. Test voltage on the big size electrolytic capacitor of ODU PCB. When DC busbar voltage V > DC420V or V < DC150V, the unit will recover back to the previous status while DC190V < V < DC410V.

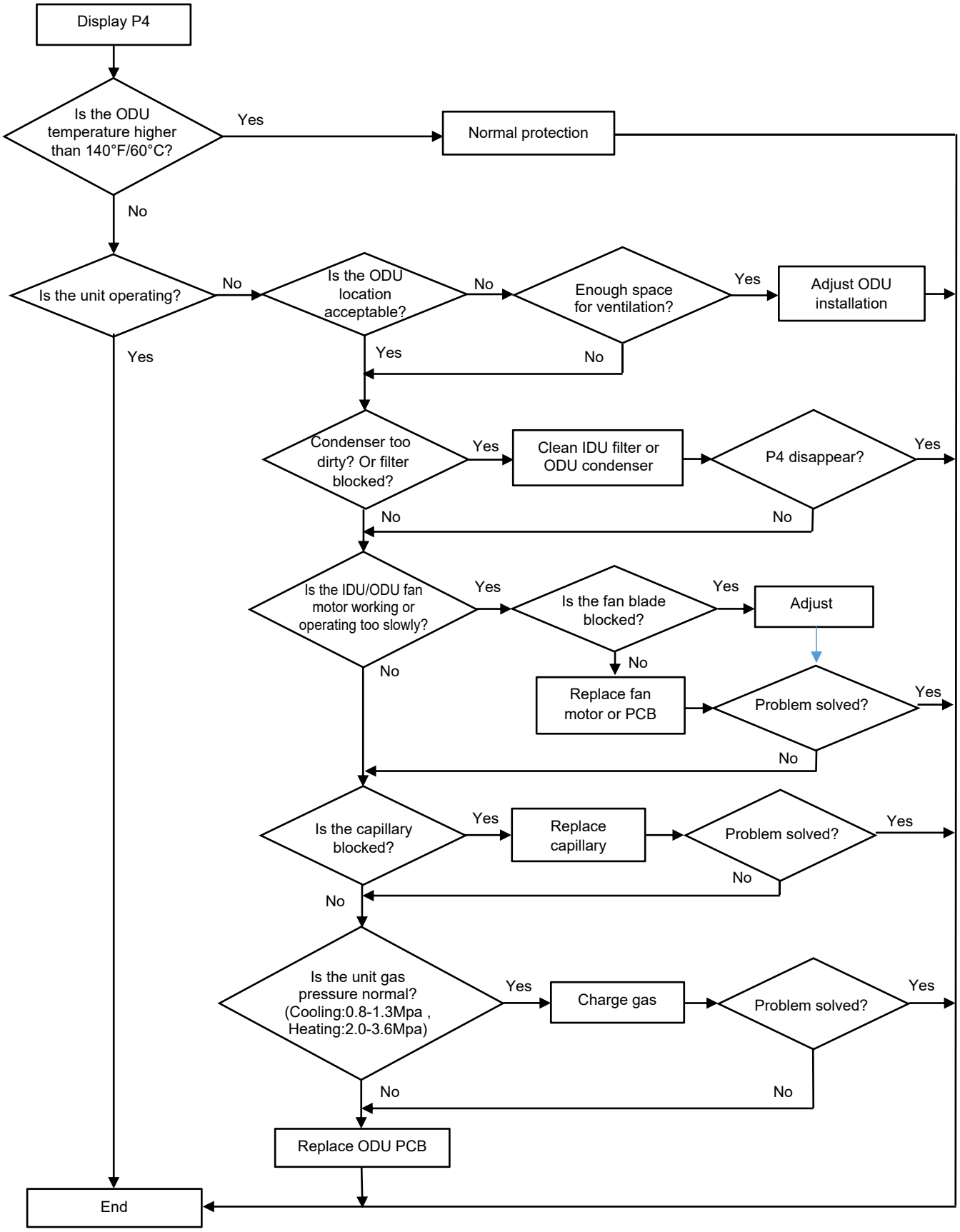


P2 --- Over-Current Protection

When the AC unit's running current is more than Imax, the unit will stop and display the "P2" error code. **Note**: For different AC models, the Imax has different valves.

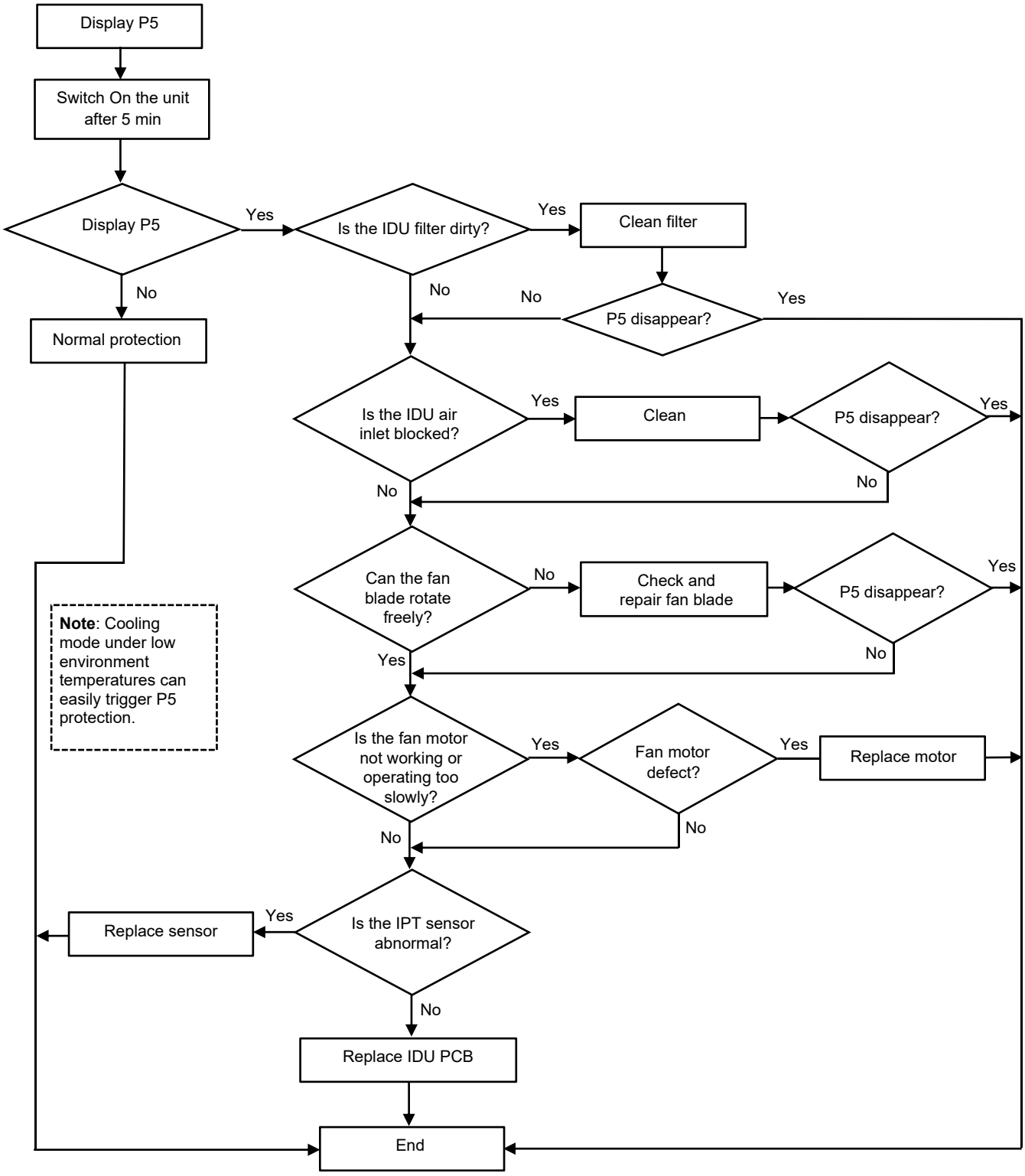


P4 --- ODU Discharge Temperature Overheating Protection



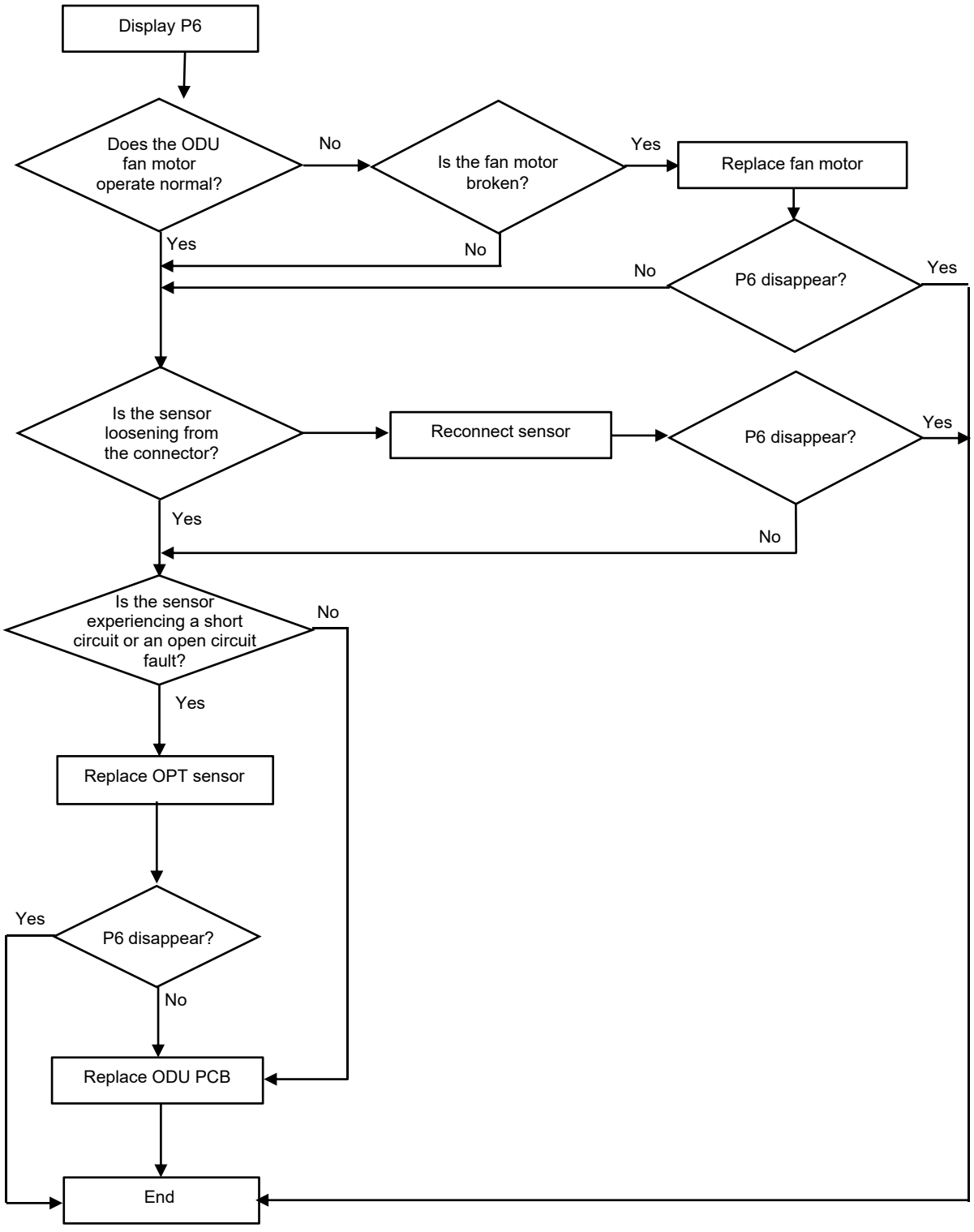
P5 --- Sub-Cooling Protection in Cooling / Dry Mode

In Cooling or Dry mode, when the IDU evaporator coil temperature IPT < 34°F (1°C) continuously for 3 min after the compressor starts up for 6 min, the CPU will switch Off the outdoor unit and display the "P5" error code.



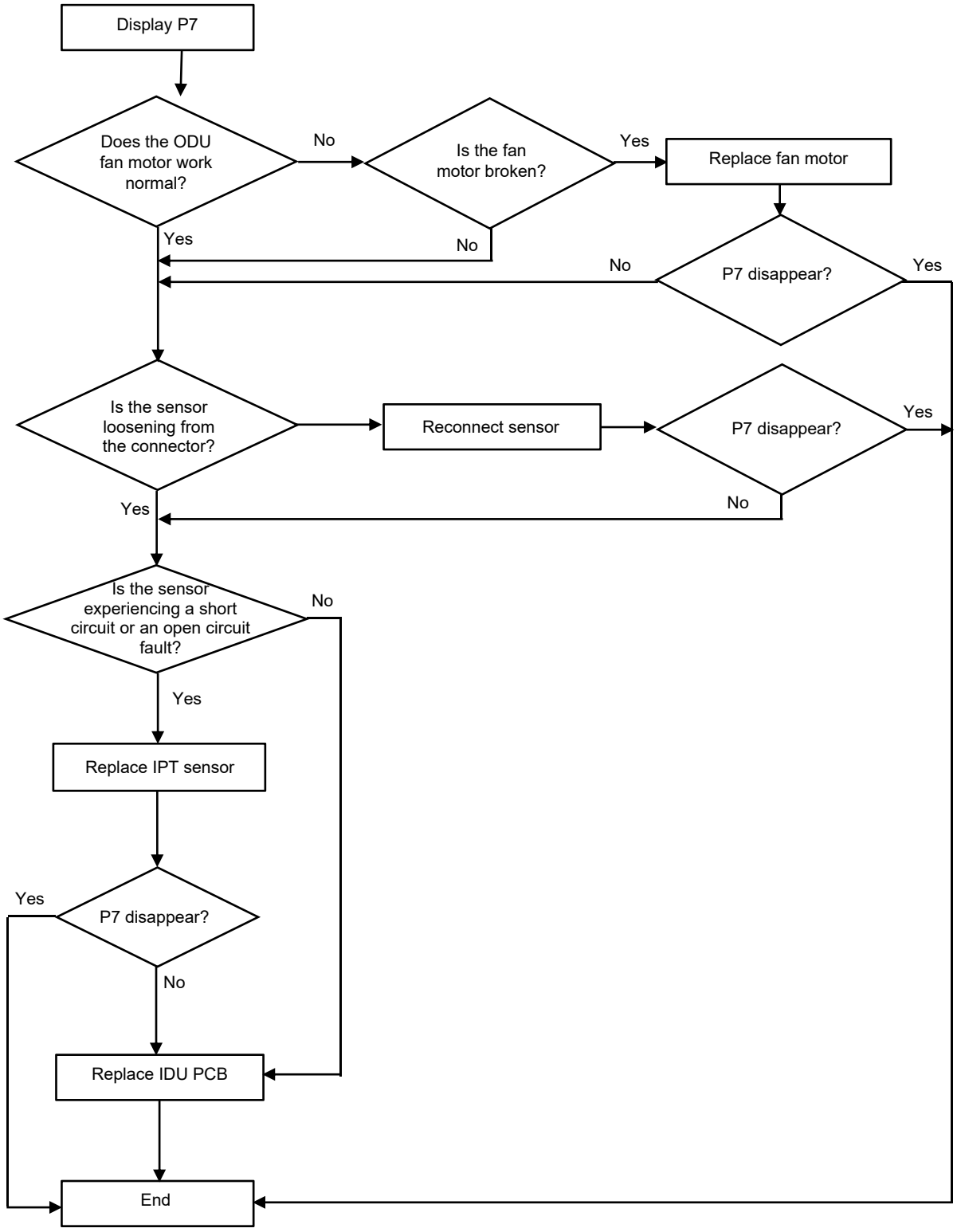
P6 --- Overheating Protection in Cooling Mode

In Cooling or Dry mode, when the ODU condenser coil temperature OPT ≥ 144°F (62°C), the MCU will switch Off the outdoor unit and display the "P6" error code.



P7 --- Overheating Protection in Heating Mode

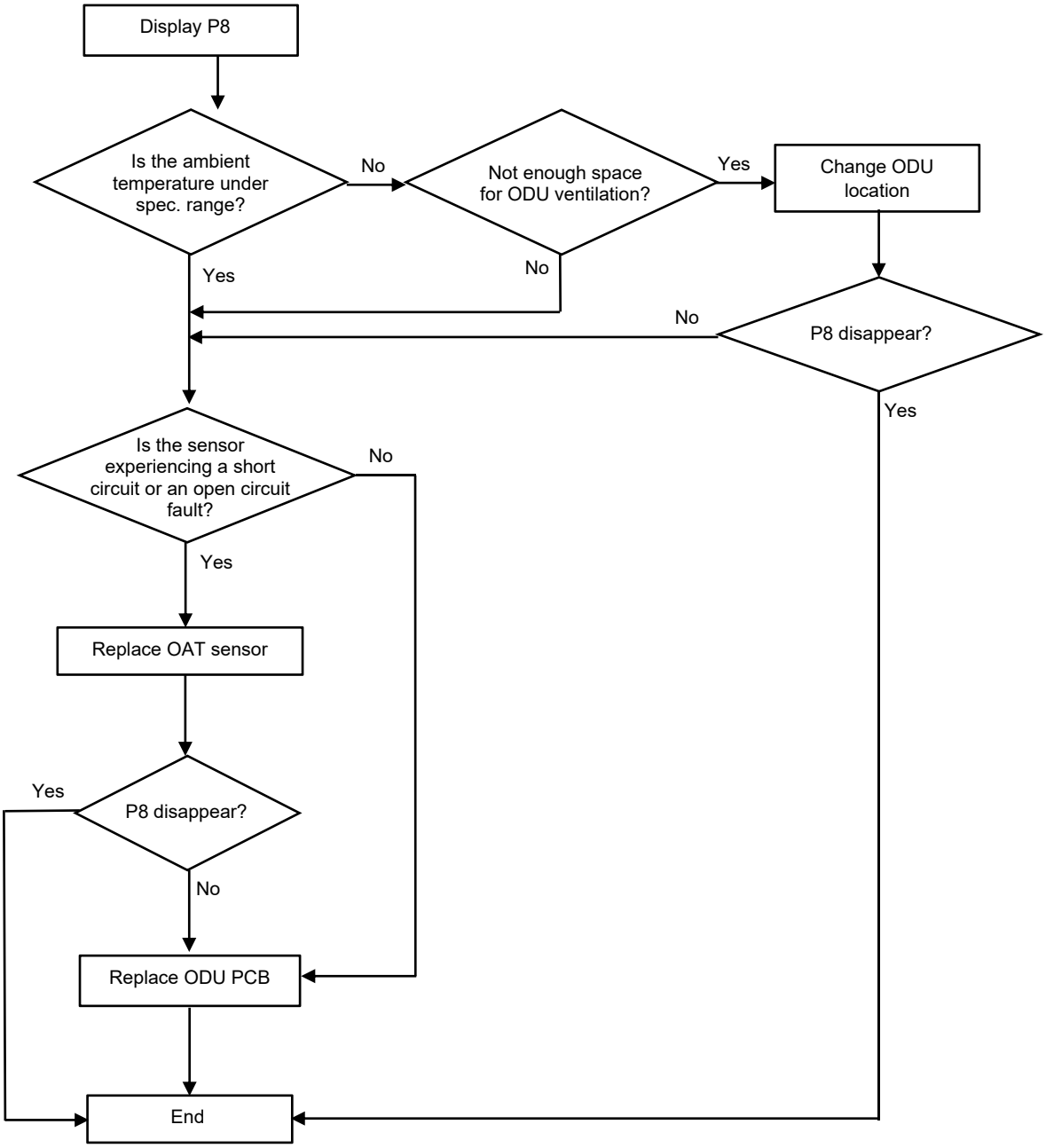
In Heating mode, when IDU evaporator coil temperature IPT ≥ 144°F (62°C), the ODU PCB will switch Off the outdoor unit and display the "P7" error code.



P8 --- Outdoor Over-Temperature / Under-Temperature Protection

If the system experiences the following environment temperatures, the compressor will stop operating. After a 200s delay, the IDU will display the "P8" error code.
(1). **In Cooling or Dry mode**: ODU ambient temperature: OAT < -4°F (-20°C) or OAT > 145°F (63°C)
(2). **In Heating mode**:

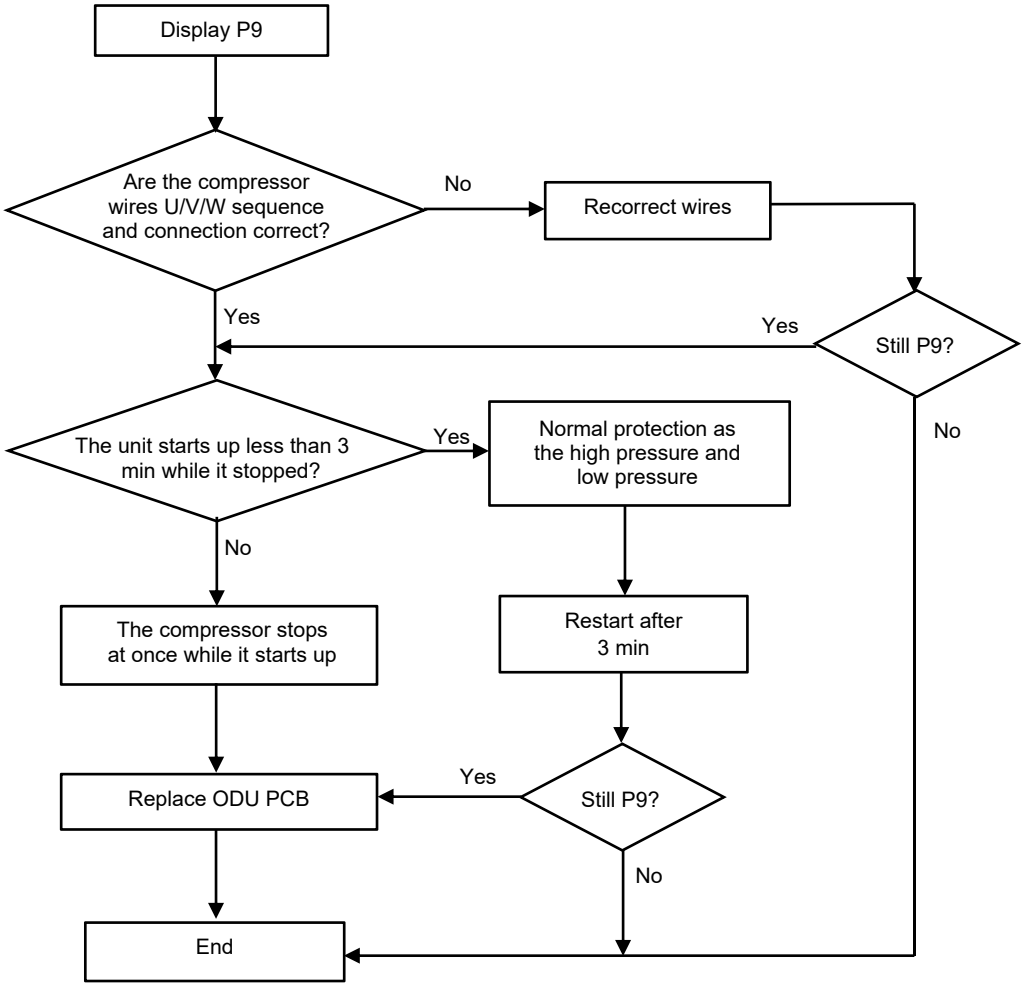
a. OAT ≥ 104°F (40°C)
b. 86°F (30°C) < OAT ≤ 104°F (40°C) and RT > 95°F (35°C)



P9 --- Compressor Driving Protection (Compressor Load Abnormal)

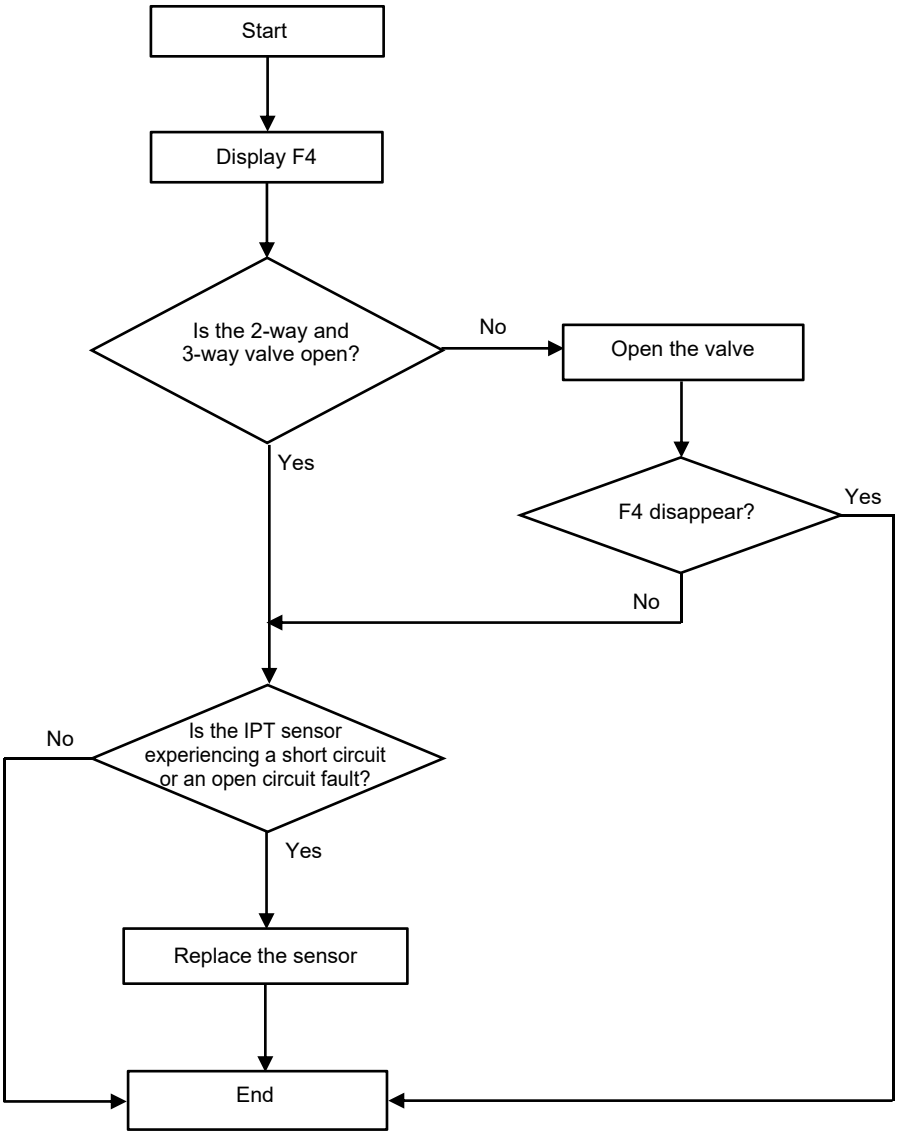
When the compressor starts up or in the process of operation, if:
(1). MCU can’t test the feedback signal from the compressor, or
(2). Tested an abnormal signal from the compressor, or
(3). The compressor startup is abnormal.

The outdoor unit will shut Off and display the "P9" error code.
The unit will restart 6 times continuously. If it still can’t work normal, then the unit will display the P9 error code again.



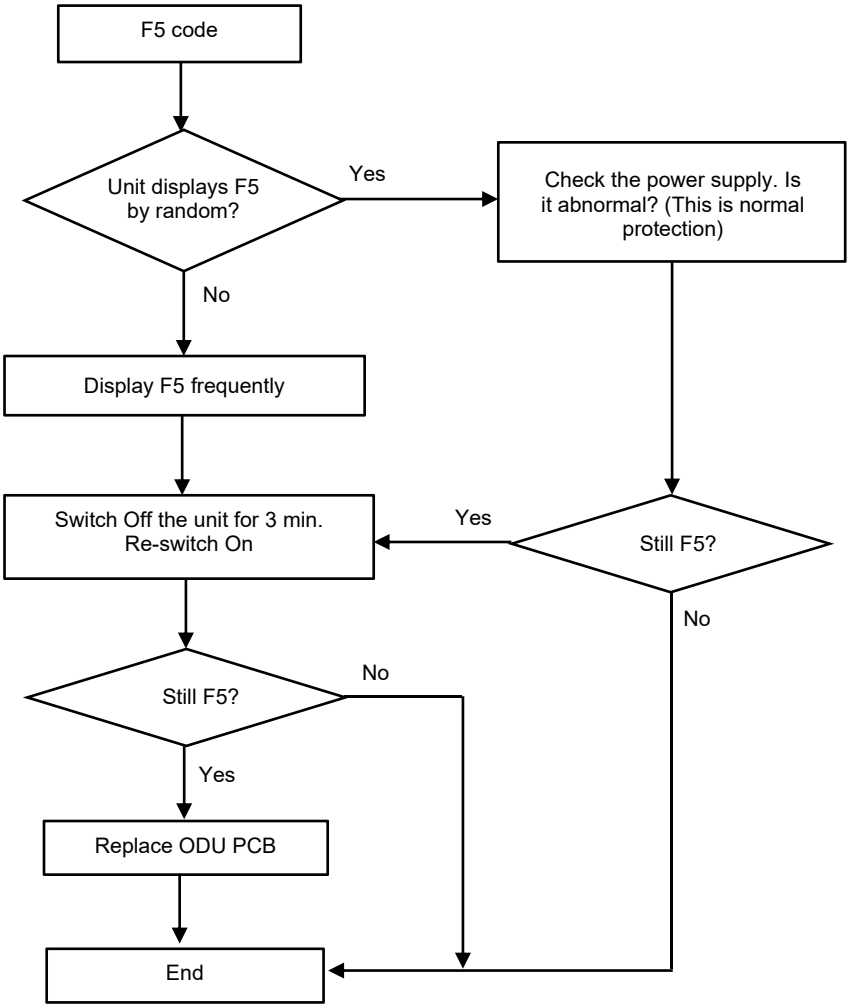
F4 --- Cooling System Gas Flow Abnormal Protection

When the compressor starts up, the unit will check the variation of the IDU coil temperature. If the installer forgets to open the 2-way or 3-way valve on the ODU, the gas can't flow in the cooling system. The unit will undergo cooling system gas flow abnormal protection and display the "F4" error code.



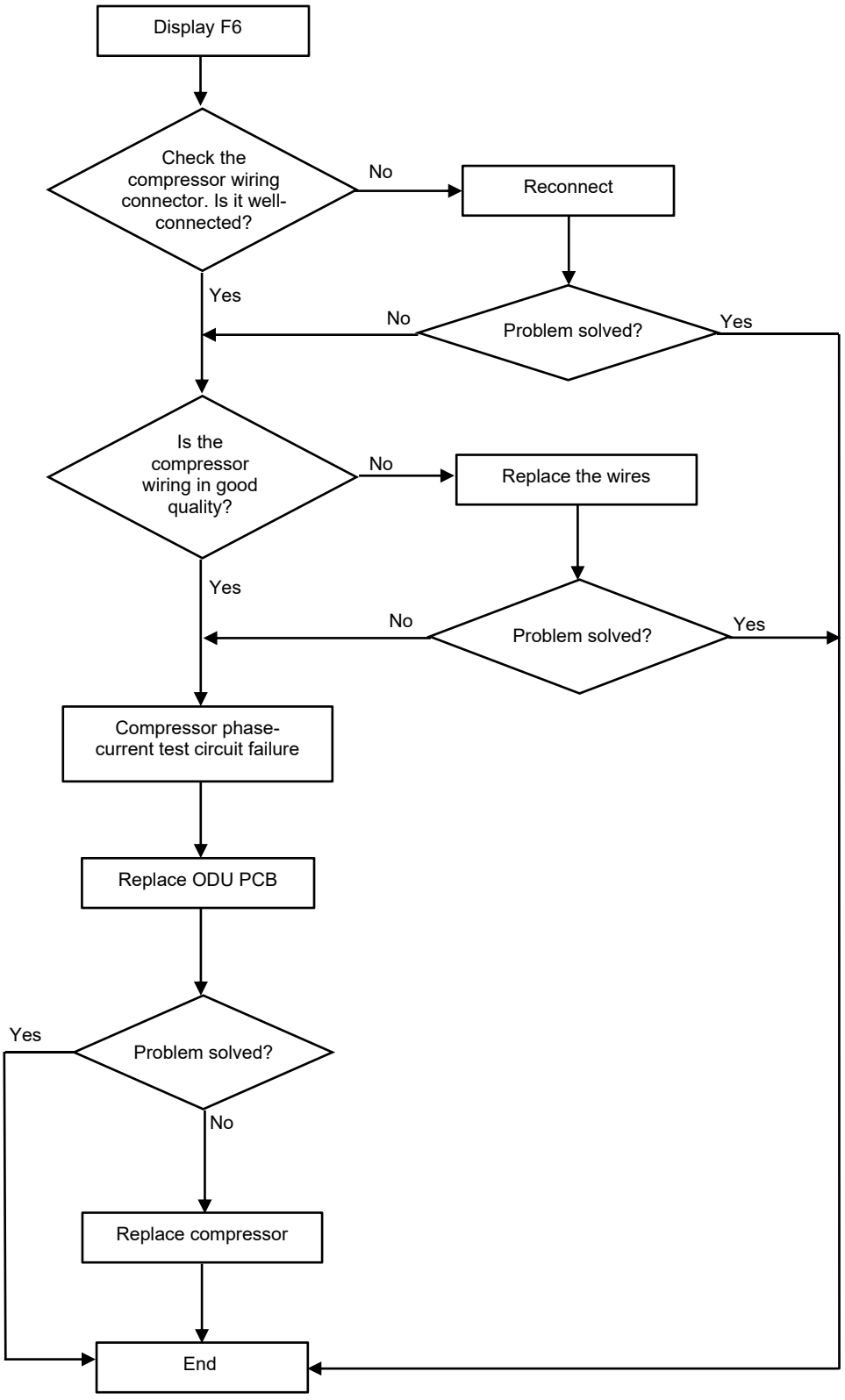
F5 --- PFC Protection

If the system undergoes PFC over-current protection, the unit will display the "F5" error code.



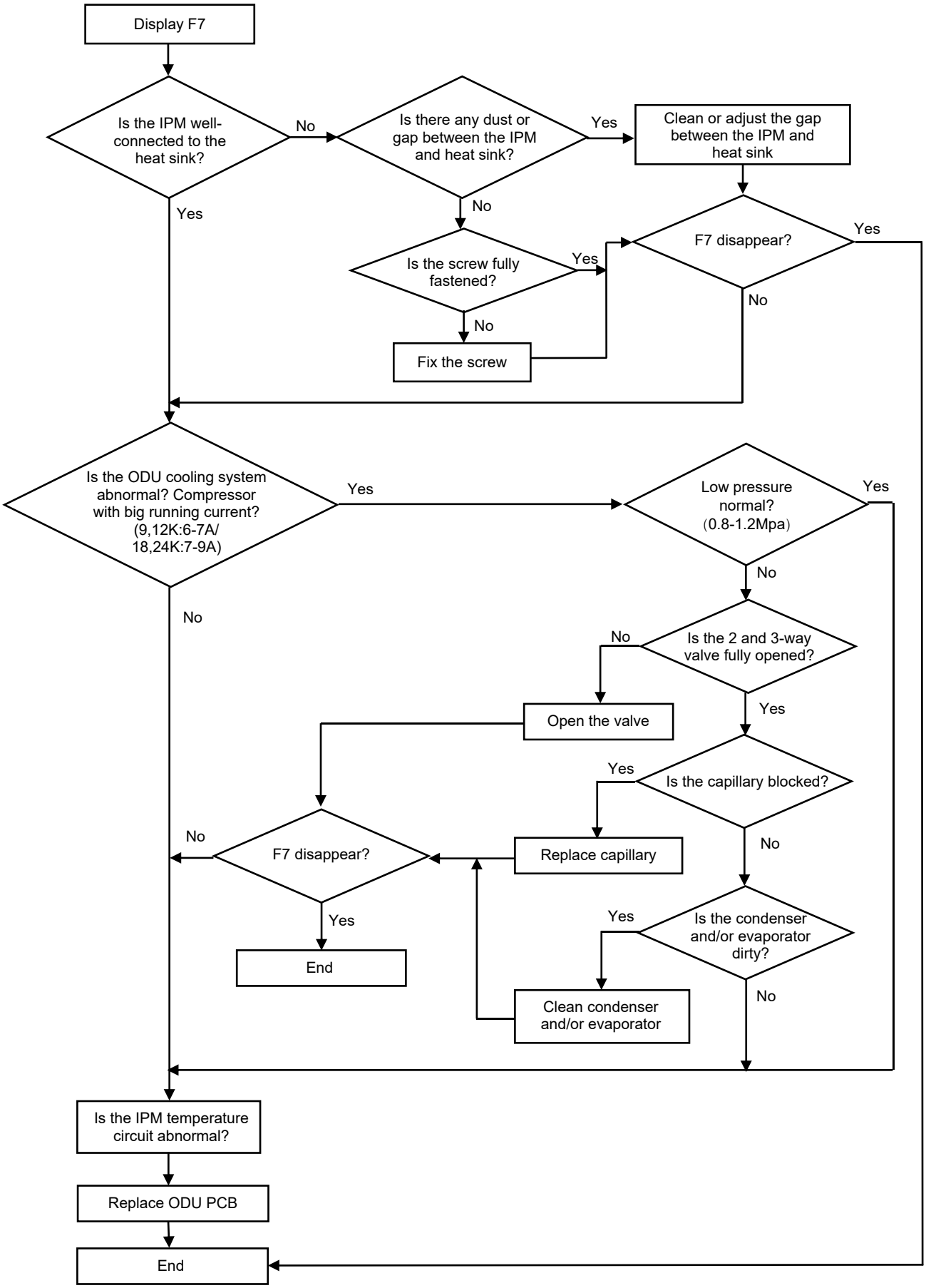
F6 --- Compressor Lack of Phase / Anti-Phase Protection

If the ODU PCB can’t test one or even three phases of the compressor's current, the unit will undergo anti-phase protection and display the "F6" error code.



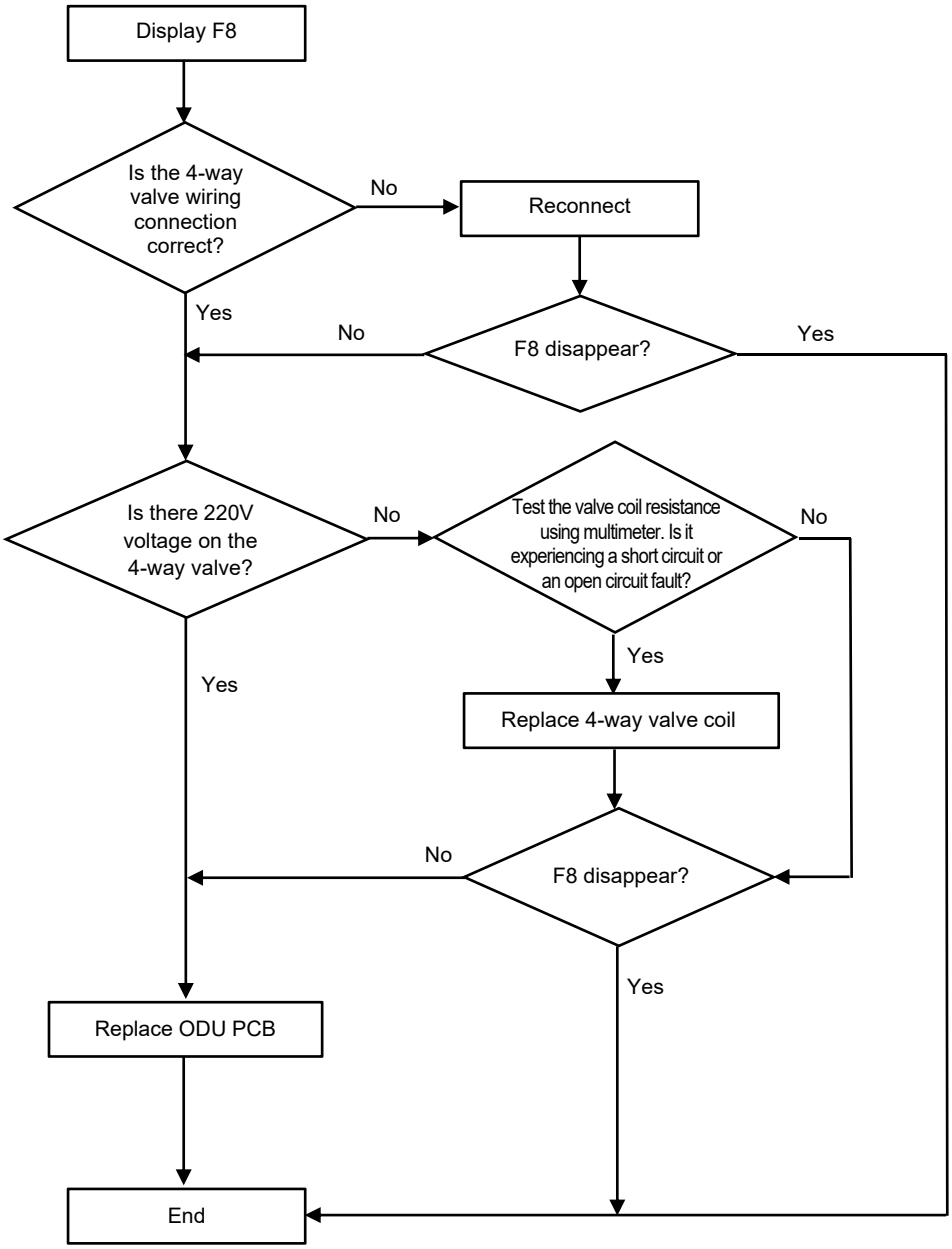
F7 --- Module Temperature Protection

If the IPM temperature is more than 203°F (95°C), the system will undergo IPM over-temperature protection and display the “F7” error code.



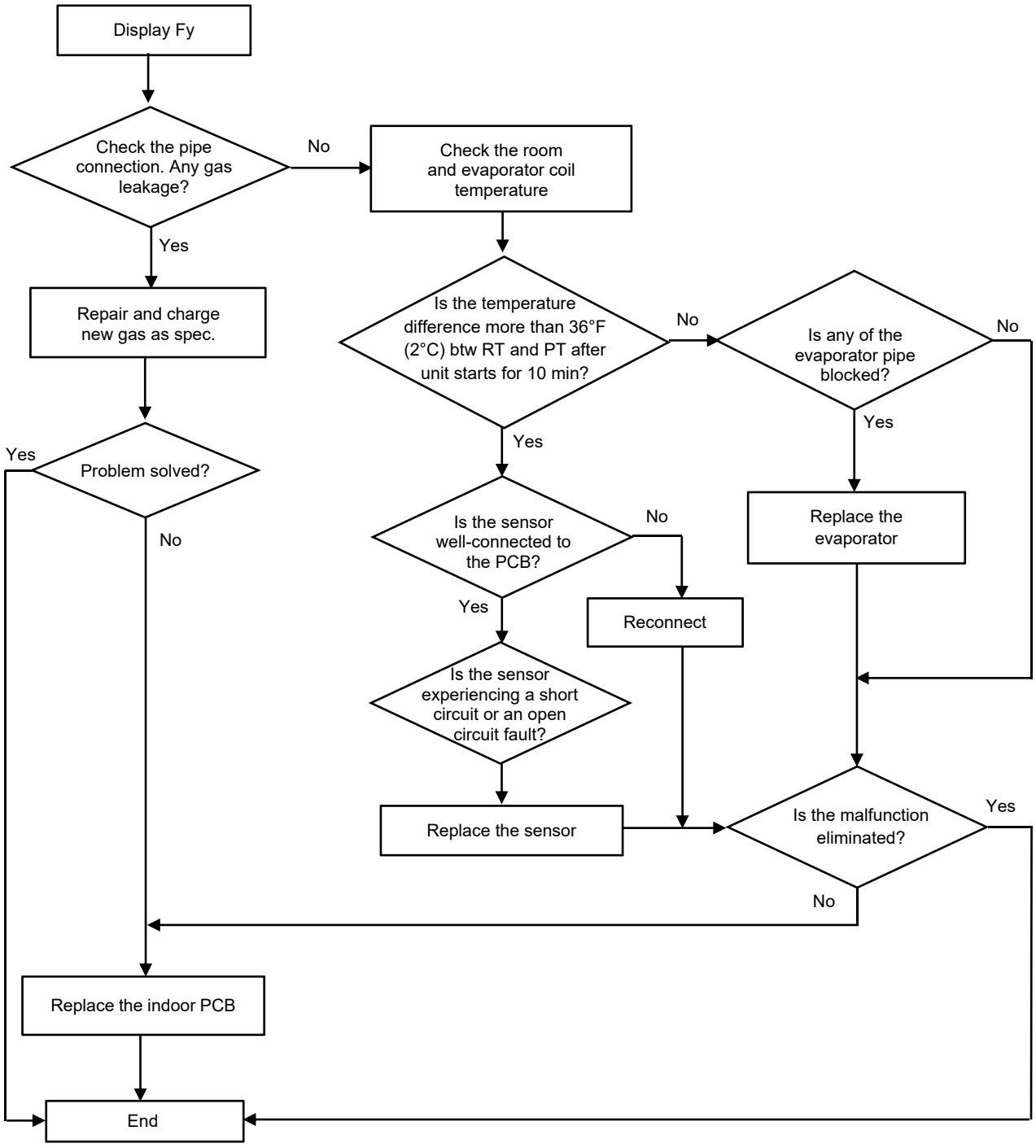
F8 --- 4-Way Value Reversing Abnormal

In Heating mode, if the IDU coil temperature is measured at 41°F/5°C (room temperature) or lower after the compressor operates for 8 min, the unit will display the "F8" error code.



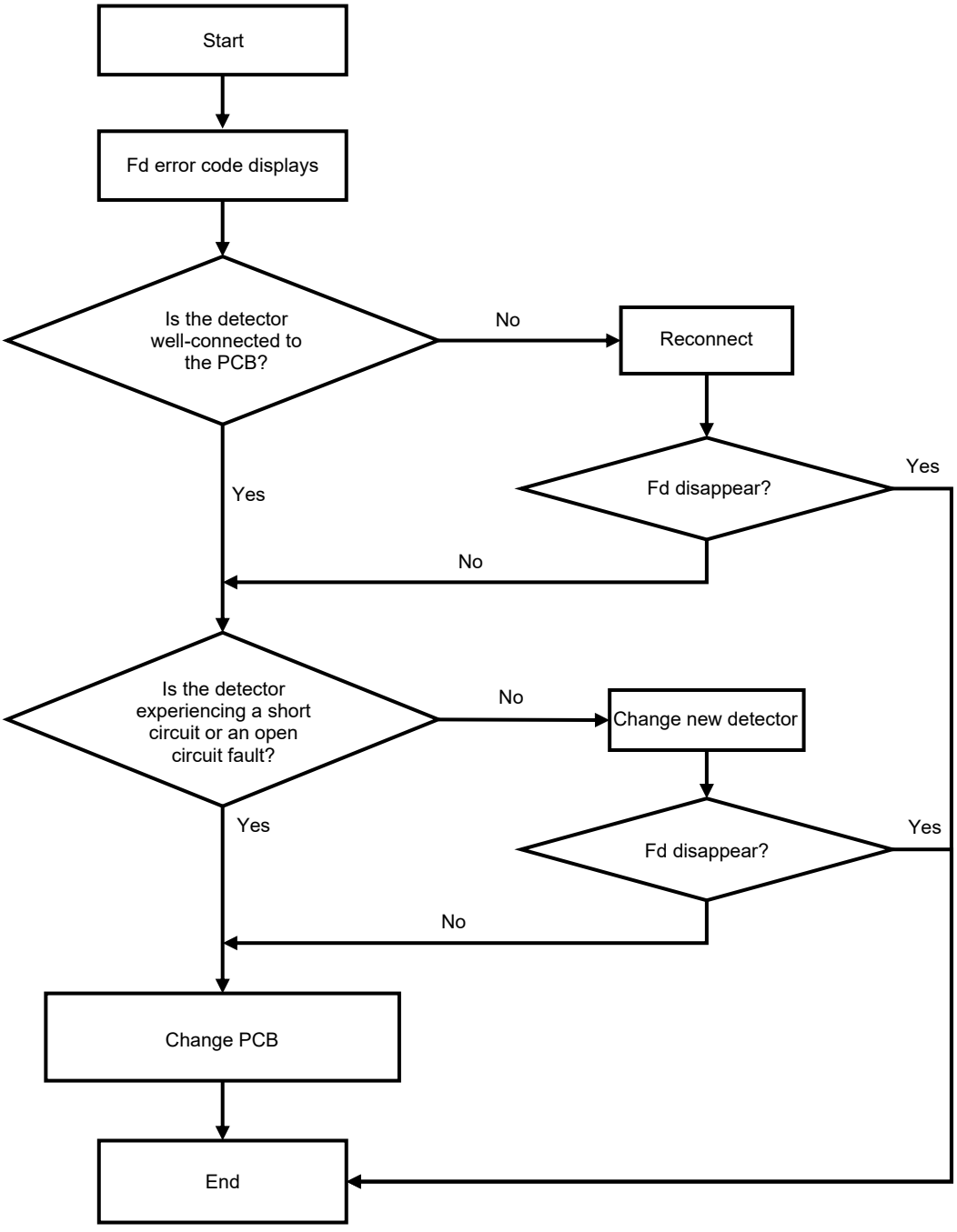
Fy --- Gas Leakage Protection

After the compressor operates at high frequency for 9 min, if the IDU evaporator and ODU condenser temperatures show only minor variations compared to previous readings but the compressor discharge temperature remains high, the unit will display the "Fy" error code.



Fd --- Refrigerant Detector Failure

If the system has detected a refrigerant leakage, the unit will display the "Fd" error code. Turn Off the unit immediately and contact a professional to check for the leakage point.



Failures Not Caused by Errors

1. If your air conditioner fails to function normally, begin by checking the following items before maintenance:

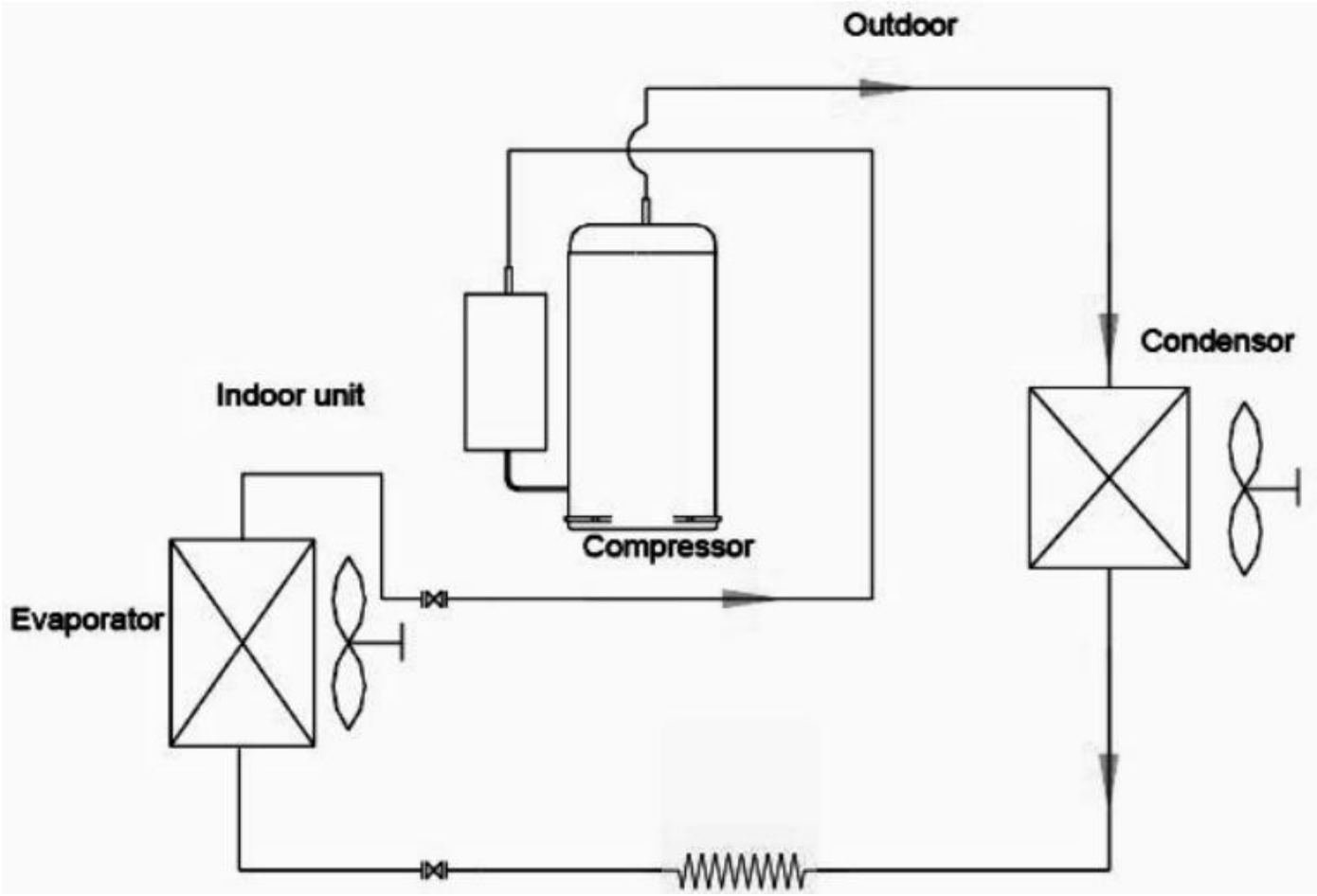
Problem	Cause	Corrective measure
The air conditioner can’t run	If you turn Off the unit and then turn it On immediately in order to protect the compressor and avoid system overload, the compressor will delay operation for 3 min.	Wait for a while.
	The wire connection is wrong.	Connect the wires according to the wiring diagram.
	Fuse of circuit breaker is broken.	Replace the fuse or switch On the circuit breaker.
	Power failure.	Restart after the power is resumed.
	Power plug is loose.	Re-insert the power plug.
	The remote controller has depleted batteries.	Replace batteries.
Bad cooling effect	The air inlet and outlet of the indoor or outdoor units is blocked.	Clear the obstacles and keep the indoor and outdoor units well-ventilated.
	Improper temperature presetting.	Reset a proper temperature.
	Fan speed operating too low for indoor unit.	Reset a proper fan speed.
	Air flow direction is not reasonable.	Change the direction of air louvers.
	Doors or windows are opened.	Close please.
	Exposed under direct sunshine.	Placing curtains in front of the windows is recommended.
	Too many heat sources in the room.	Remove unnecessary heat sources.
	Filter is blocked or too dirty.	Clean the filter.

2. The following situations are not operation failures:

Problem	Time of Occurrence	Cause
Mist comes from the air conditioner	During operation.	If the unit is running under high humidity, the wet air in the room will be quickly cooled down.
The air conditioner generates some noise	The air conditioner is buzzing at the beginning of operation.	Temperature controller will be buzzing when it starts working, the noise will become weak 1 min later.
Dust comes from the air conditioner	When the unit is turned On, it purrs.	When the system just starts, the refrigerant is not stable. About 30s later, the purr of the unit becomes low.
	There is a hissing sound when the unit starts or stops, as well as a slight hissing sound during/after the operation.	It's the sound of gaseous refrigerant that stops flowing and sound of the drainage system.
	There is a sound of crunching during/ after operation.	Because of temperature change, the front panel and other components may be swelling up, causing the abrasion sound.
	The unit starts operation after being unused for a long time.	Dust inside the indoor unit comes out together with the air.
The air conditioner generates some smell	During operation.	The room or the smell of cigarettes comes out through the indoor unit.

5.3. Maintenance

5.3.1.System Diagram



5.3.2. Maintenance of Major Components

Maintenance

1). Inspections Before Maintenance

(1) Inspection of Maintenance Environment

- Before operation, ensure no leaked refrigerant is present in the room.
- Only operate in rooms meeting the area requirements on the nameplate.
- Ensure the room maintains a continuous ventilation state.
- Restrict fire, welding, smoking, drying oven, or any other goods with temperatures higher than 698°F/370° C (R290) or 1,018°F/548°C (R32) from being in the room.
- Ensure mobile phones or any electronic products containing radiation are powered Off while in the room.
- Equip the maintenance area with a functioning drying powder or carbon dioxide fire extinguish.

(2) Inspection of Maintenance Equipment

- Check whether the maintenance equipment is applicable to the refrigerant or not. Only use the professional equipment recommended by the air conditioner manufacturer.
- Check whether the refrigerant leak detector has been calibrated. The set maximum alarm concentration of the refrigerant leak detector should not exceed 25% of the lower explosion limit (LEL). The refrigerant leak detector must be operating during maintenance.

2). Inspection of Air Conditioner

- Before maintenance, ensure the air conditioner is in reliable ground connection.
- Ensure the air conditioner's power supply is Off. Before maintenance, turn Off the power and discharge the capacitor power, which is used in the air conditioner. If you need the power supply during maintenance, perform ongoing leak detections at the most dangerous position/point to avoid potential danger.
- Check whether the warning labels on the air conditioner are in good condition. It is necessary to replace damaged or smeared warning labels.

3). Leak Inspection Before Maintenance

Before maintenance, check whether the air conditioner is leaking using the leak detector or concentration detector (pump-type) recommended by the corresponding air conditioner manufacturer.

Warning

If a leak potentially exists, extinguish or remove all the fire from the site. Then, immediately shut Off the air conditioner. Meanwhile, ensure the area is well-ventilated.

4). Safety Principles During Maintenance

- During maintenance, ensure the site is well-ventilated.
- Using fire, such as welding or smoking, is prohibited. Using mobile phones is also prohibited.
- If the relative humidity is lower than 40%, wear anti-static clothing and gloves.
- If the combustible refrigerant is found leaking during maintenance, immediately implement forced ventilation and plug up the leak source.

- If the product is damaged to the extent that the refrigerant system must be opened for maintenance, carry the product back to the maintenance station. Welding refrigerant pipes or conducting similar operations are prohibited at the user's site.

- If providing visiting service is necessary due to lacking spare parts during maintenance, return the air conditioner to its initial state. Ensure the refrigerant system is in secure ground connection.

- When storing the cylinder in a vehicle or in the maintenance site, ensure it is placed vertically and securely. Keep the cylinder away from heat, combustion, and radiation sources, as well as electrical equipment.

5). Requirements for the Maintenance-Station Site

- The maintenance location should be well-ventilated with a leveled ground. The location should not be in a basement.

- Divide the maintenance location into welding and non-welding areas and label them clearly. Ensure there is a certain safety distance between the two areas.

- Equip the maintenance location with ventilation and air-exhaustion to prevent the refrigerant gas from aggregating.

- Set the main power switch outside the maintenance location. Equip the main power switch with protective (explosion-proof) devices.

- Provide a combustible refrigerant leak detector and leak detecting instrument management system. Confirm the leak detector is operating normally before maintenance.

- Provide firefighting devices appropriate for extinguishing electrical fires, such as dry power or carbon dioxide fire extinguishers. Keep the firefighting devices in usable condition.

- Temporary wires and sockets are prohibited in the maintenance location.

6). Requirements for Filling the Refrigerants

- Before operating the refrigerant system, clear the cyclic system using nitrogen. Vacuum the outdoor unit for at least 30 min.

- Ensure there is no cross contamination among different refrigerants when using the refrigerant filling device. The total length, including the refrigerant pipeline, should be as short as possible in order to reduce the residual refrigerant inside the pipeline.

- Vertically place the refrigerant storage tanks.

- Ensure the refrigerating system is in ground connection before filling the refrigerant.

- When filling the refrigerant, utilize the corresponding type and volume of refrigerant as per the requirements on the product nameplate. Overfilling is prohibited.

- Seal the system safely after maintaining the refrigerating system.

- Ensure the maintenance will not damage or reduce the safety protection grade of the original system.

7). In-Maintenance Welding

- Ensure the maintenance location is well-ventilated.
- Before welding the outdoor unit, confirm the refrigerating system has been drained and cleaned. Ensure there has been no refrigerant in the outdoor unit.
- Close the stop valve of the outdoor unit when using a welding gun for maintenance.

8). Maintenance of Electrical Components

- Use a special leak detector to check whether the location of the maintained electrical parts has a refrigerant leak.
- It is prohibited to refit, remove, or cancel any component with the safety protection function after finishing maintenance.
- When maintaining the sealed parts, you must turn Off the air conditioner's power before opening the sealing cover. When power supply is needed, perform ongoing leak detection at the most dangerous position.
- It is necessary to note that the maintenance of electrical components will not affect the replacement of protective covers.
- Ensure the sealing function is not damaged after maintenance. Ensure the sealing material's ability to prevent combustible gas leaks will not diminish due to aging. The substitute components should meet the requirements recommended by the air conditioner manufacturer.

Warning

Before doing the trial operation after finishing the maintenance, use a practical leak detector to inspect for leakages and reliability of the ground connection. It is required to ensure there is a reliable ground connection and no refrigerant leakage. Separately place the refrigerant storage tanks in a well-ventilated place with the temperatures ranging from 14-122°F (-10-50°C). Label refrigerant storage tanks with warning labels.

9). Emergency Accident Handling

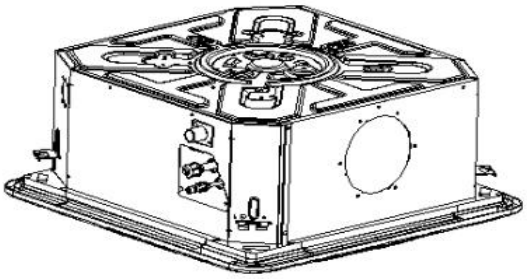
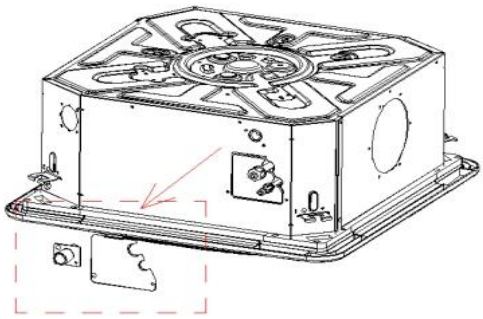
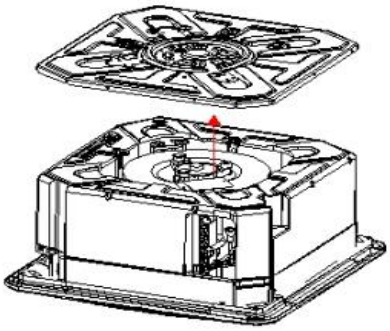
Establish emergency handling plans for the maintenance station. Take appropriate precautionary measures while working. For example, it is prohibited to enter the location with any kindling material or wear clothing and shoes that easily produce static.

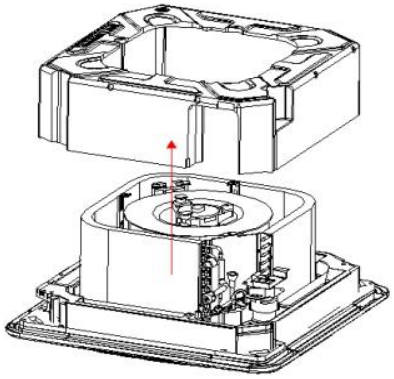
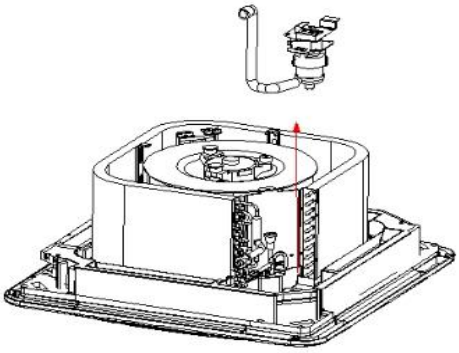
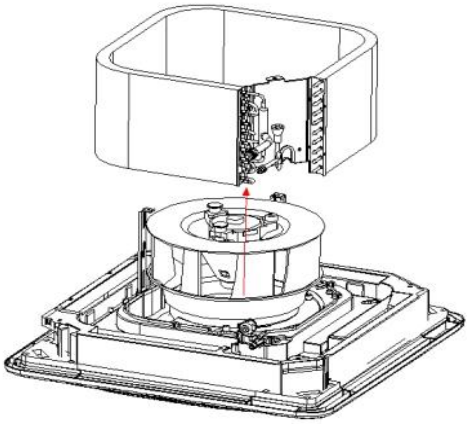
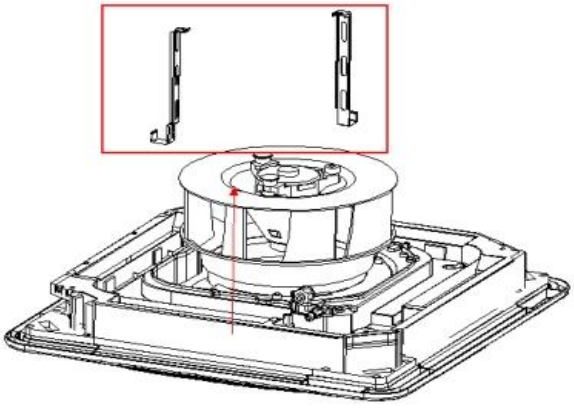
Use these suggestions if a large amount of combustible refrigerant leaks:

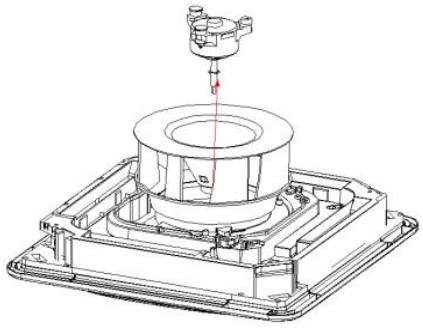
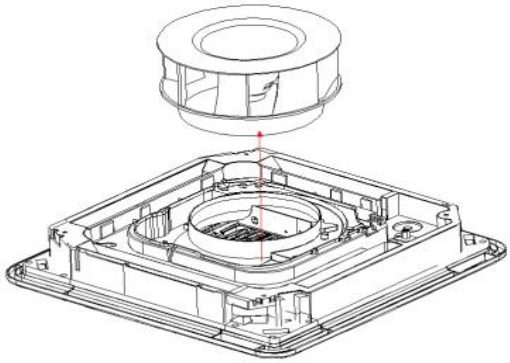
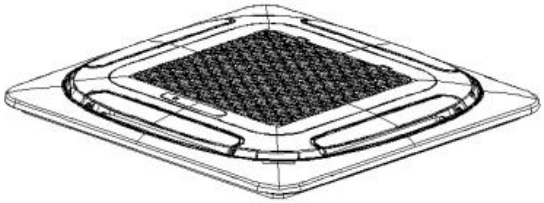
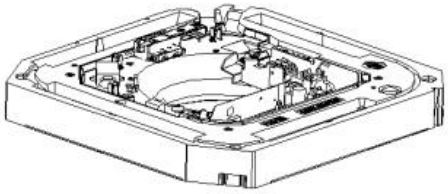
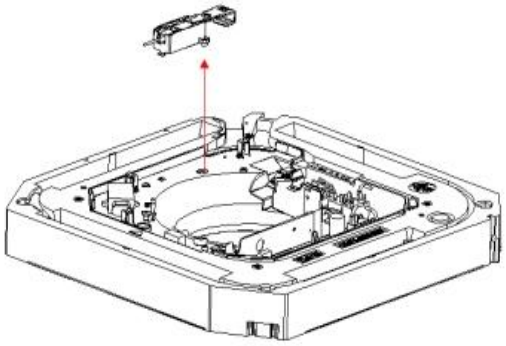
- Immediately operate the ventilating equipment while cutting Off the other power supply. Evacuate the affected personnel urgently from the location.
- Inform nearby residents to evacuate for over 66 ft (20m) from the location and make an alarm call. Set the emergency area and prohibit irrelevant personnel and vehicles from approaching.
- The professional firefighters should wear anti-static clothing to handle the emergency on the site. The firefighters should also cut Off the source of the leak.
- Use nitrogen for blowing the site, especially the low-lying positions. Clear away the residual combustible refrigerant gas from any area surrounding the leak point and nearby. Use a handheld detector for detection. Do not clear the alarm until the concentration of refrigerant is zero.

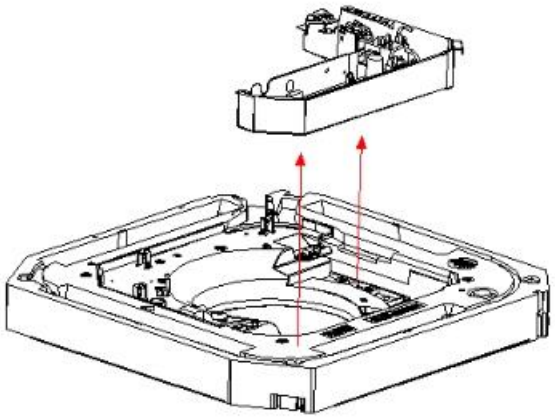
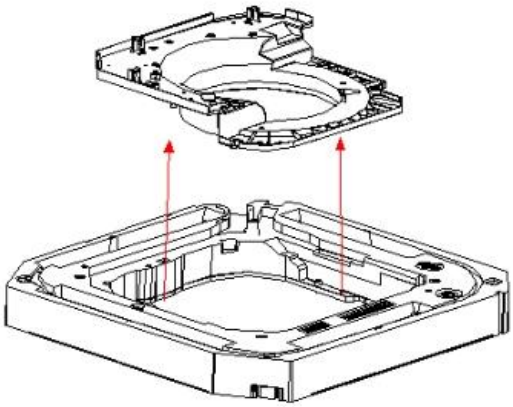
5.4. IDU and ODU Disassembly

Cassette (IDU) Disassembly

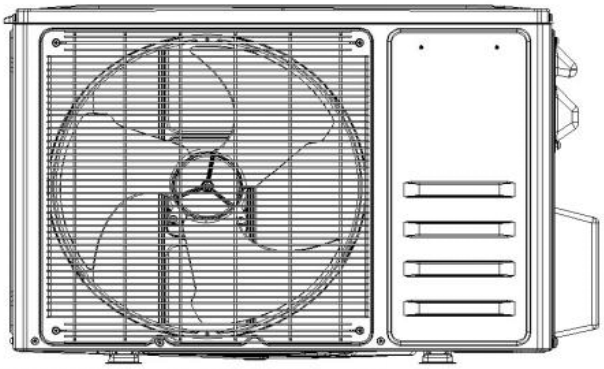
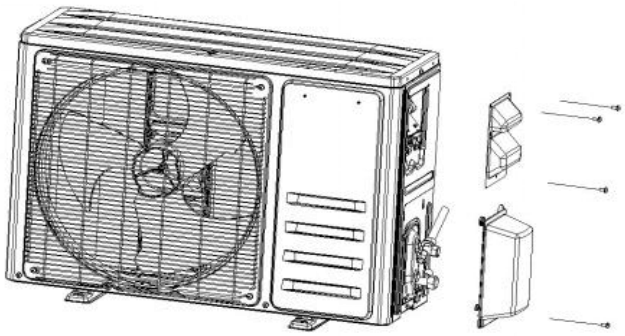
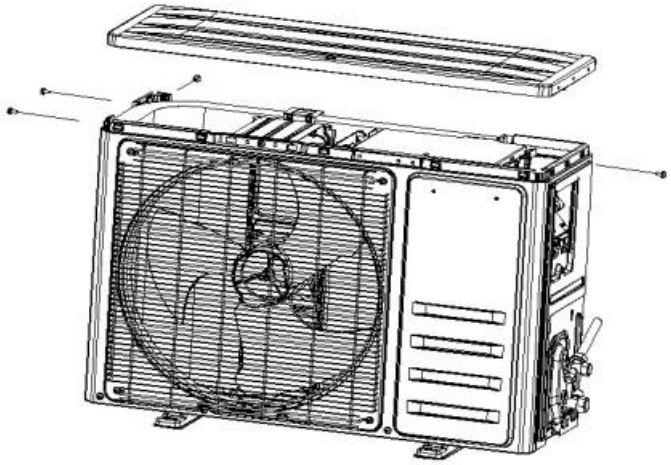
Steps	Reference Photo
Before disassembly	
1. Remove the seal plate and drain spout	
A. Disassemble the seal plate. **B.** Remove the drain spout.	
2. Remove the front and rear fascia assembly	
Unfix the screws and hooks on the base plate, as well as the front and rear panel assembly. Remove the front and rear fascia assembly from the unit.	
3. Dismantle the base assembly	
Remove the chassis components by unfixing the screws between the base foam part, evaporator fix plate, and base assembly.	

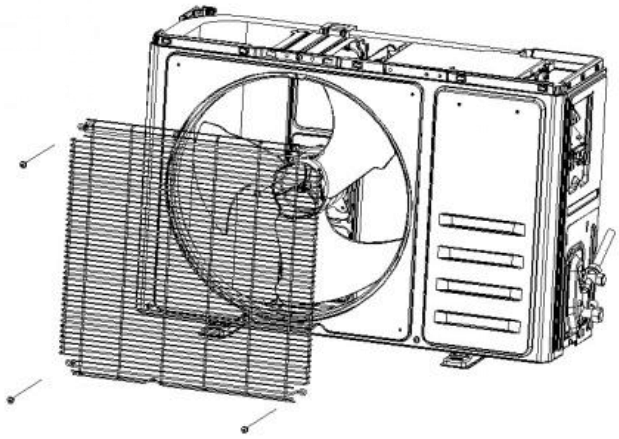
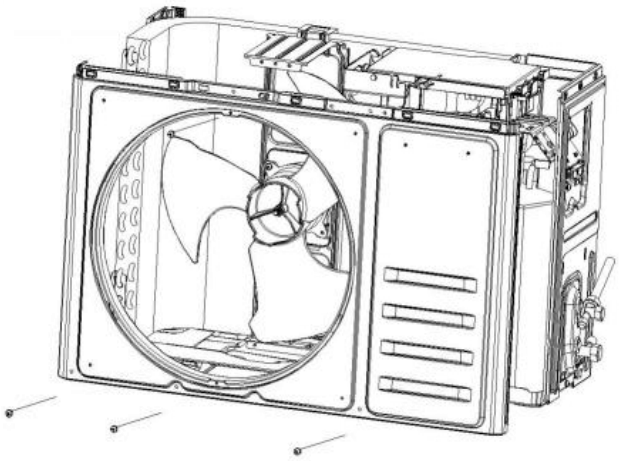
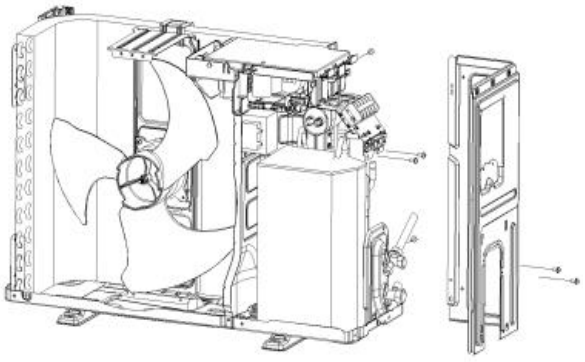
4. Remove the base foam assembly	
Remove the base foam assembly as shown in the photo.	
5. Dismantle the water pump assembly	
Dismantle the water pump assembly as shown in the photo. Take the water pump out in the same direction shown in the photo.	
6. Dismantle the evaporator assembly	
Dismantle the evaporator assembly as in the photo. Take the evaporator out in the same direction shown in the photo.	
7. Remove the evaporator fixing plates	
Remove the evaporator fixing plates in the same direction as shown in the photo.	

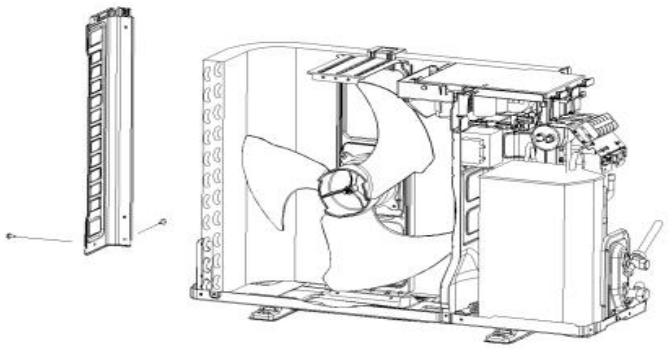
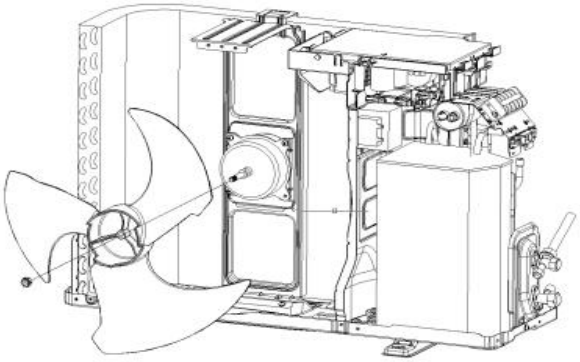
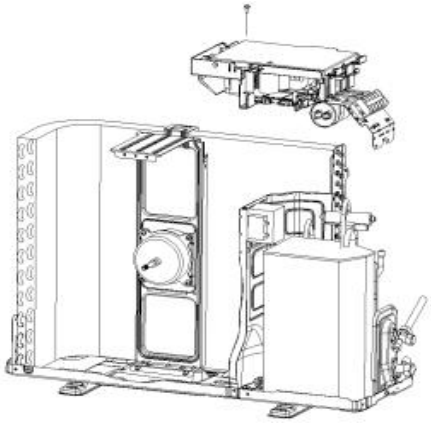
8. Disassemble the DC motor	
Disassemble the DC motor as shown in the photo.	
9. Remove the centrifugal fan	
Remove the centrifugal fan as shown in the photo.	
10. Remove the panel assembly	
Unfix the screws on the panel and drainage assembly. Remove the panel assembly	 
11. Remove the USB/Wi-Fi module	
Unfix the screws on the USB/Wi-Fi module and air guide part. Remove the module.	

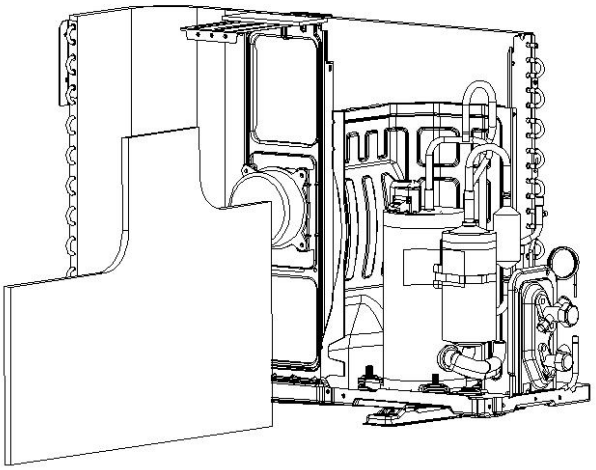
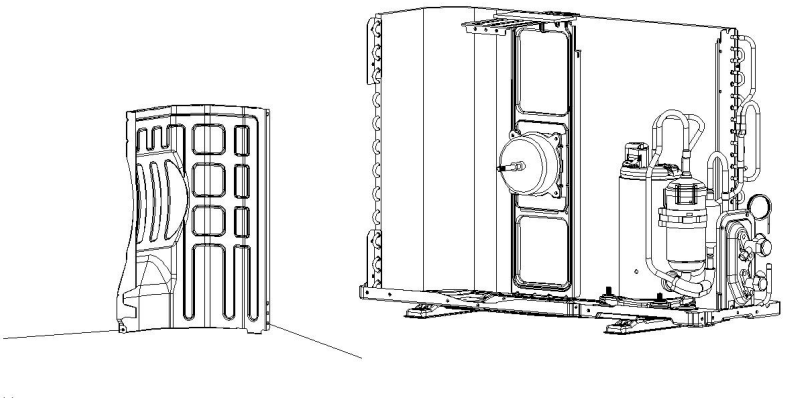
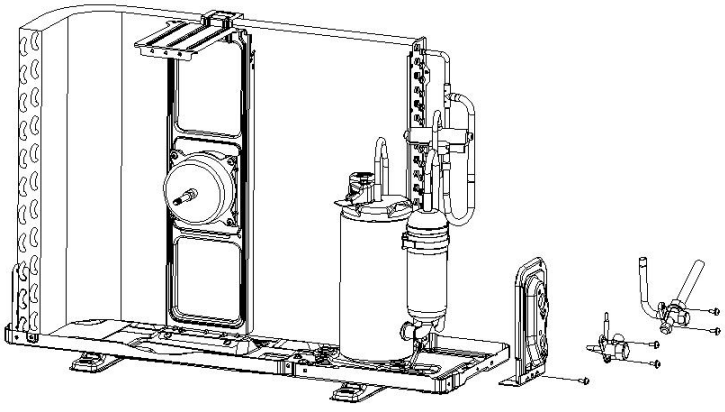
12. Remove the electric box assembly	
Unfix the screws on the electric control box, water tray assembly, and air guide in the direction shown in the photo. Remove the electric control box assembly.	
13. Disassemble the air guide parts	
Unfix the screws on the guide parts and water tray. Remove the air guide parts.	

ODU Disassembly

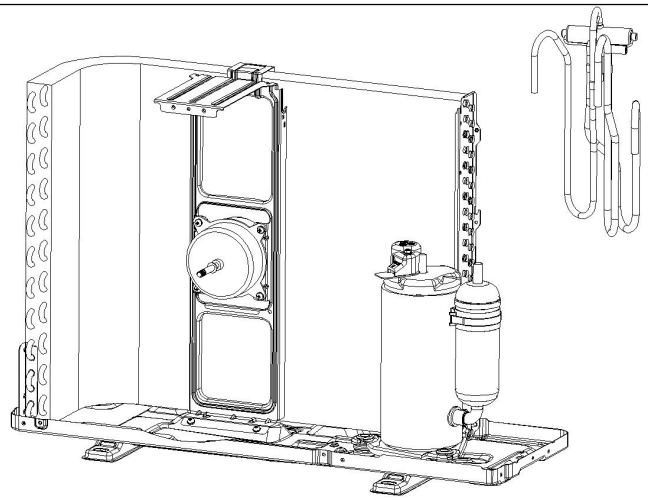
Steps		Reference Photo
Before disassembly		
1: Remove the PCB cover, valve cover, and top cover		
A	**1).** Unfix 1 screw on the PCB cover, then you can remove the cover from the unit. **2).** Unfix 1 screw on the valve cover, and then you can take it out.	
B	Unfix the screws on the top/left/ right plates, and then you can take the top cover off.	

2. Disassemble the fan guard and front panel		
A	Remove the grille screws from the front panel, then take out the grille.	
B	**1).** Unfix the screws on the front panel of the fan guard. **2).** Separate the ODU middle plate and base plate. Lift the front panel so you can take it out from the unit.	
3. Disassemble the left and right plate		
A	Unfix the screws on the right plate, electric box assembly, valve plate, and base plate. You can then remove the right plate.	

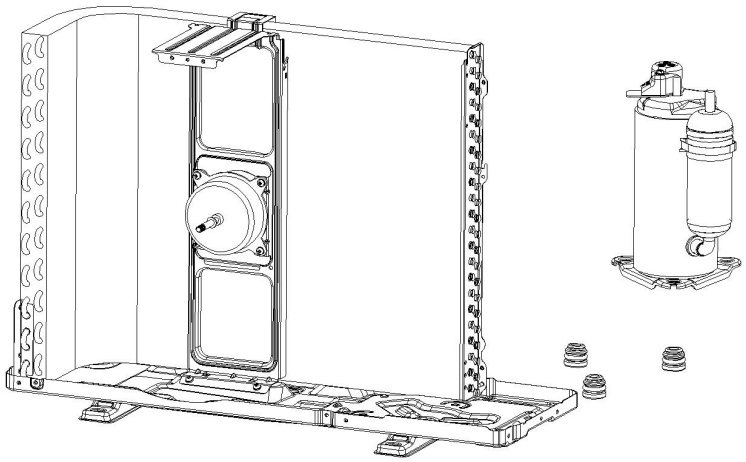
B	Unfix the screws on the left plate, base plate, and condenser plate. You can then take the left plate out.	
4. Disassemble the axis fan blade		
A	Unscrew the fan blade nut. Remove the blade.	
5. Disassemble the electric box		
A	Unfix the screws on the electric box and motor supporter. Loosen the wiring clamp, then you can take the control box out.	

6. Remove the noise cotton		
A	Take the cotton out, as shown in the picture.	
7. Disassemble the separate plate		
A	Unfix the screw on the separate plate and unit, then take it out.	
8. Disassemble the 2-way and 3-way valve		
A	Unfix the screws on the valve plate and base. You can take the 2-way and 3-way valve out by welding. **Note**: **1).** Welding can only occur while there is no gas in the unit. **2).** Pay attention to the fire to prevent any injury.	

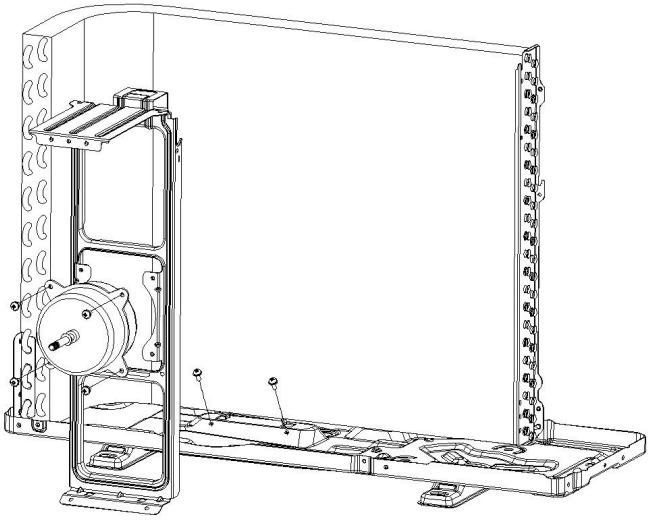
9. Disassemble the 4-way valve assembly

A	Remove the 4-way valve from the system by welding. Ensure there is no damage to the compressor, nameplate, etc.	

10. Disassemble the compressor

A	Unscrew the nuts and remove the compressor.	

11. Remove the fan motor and fan supporter

A	Unfix the screws on the fan motor and supporter, then remove the supporter of the base plate. **Note**: Pay attention to the motor wiring. It can't be taken out by force.	

6. Appendix

Resistance/Temperature Lists of Temperature Sensors

Temp.	Resistance (KΩ)			Temp.	Resistance (KΩ)			Temp.	Resistance (KΩ)		
°F/°C	Rmax	R(t) Normal	Rmin	°F/°C	Rmax	R(t) Normal	Rmin	°F/°C	Rmax	R(t) Normal	Rmin
-22°F/-30°C	68.080	64.104	60.343	68°F/20°C	6.223	6.083	5.945	158°F/70°C	1.112	1.073	1.035
-20°F/-29°C	64.375	60.666	57.157	70°F/21°C	5.977	5.846	5.716	160°F/71°C	1.079	1.041	1.004
-18°F/-28°C	60.870	57.413	54.139	72°F/22°C	5.742	5.620	5.498	162°F/72°C	1.047	1.010	0.974
-17°F/-27°C	57.579	54.355	51.301	74°F/23°C	5.518	5.404	5.290	163°F/73°C	1.016	0.980	0.944
-15°F/-26°C	54.487	51.480	48.630	75°F/24°C	5.305	5.198	5.091	165°F/74°C	0.988	0.952	0.917
-13°F/-25°C	51.582	48.776	46.115	77°F/25°C	5.100	5.000	4.900	167°F/75°C	0.959	0.924	0.890
-11°F/-24°C	48.850	46.232	43.748	79°F/26°C	4.909	4.811	4.713	169°F/76°C	0.931	0.897	0.864
-9°F/-23°C	46.279	43.836	41.517	81°F/27°C	4.727	4.630	4.533	171°F/77°C	0.904	0.871	0.839
-8°F/-22°C	43.861	41.581	39.415	82°F/28°C	4.552	4.457	4.362	172°F/78°C	0.879	0.846	0.814
-6°F/-21°C	41.585	39.456	37.432	84°F/29°C	4.386	4.292	4.199	174°F/79°C	0.854	0.822	0.791
-4°F/-20°C	39.462	37.473	35.581	86°F/30°C	4.225	4.133	4.042	176°F/80°C	0.830	0.799	0.769
-2°F/-19°C	37.421	35.565	33.798	88°F/31°C	4.072	3.982	3.892	178°F/81°C	0.807	0.776	0.746
-0°F/-18°C	35.519	33.785	32.134	90°F/32°C	3.925	3.836	3.748	180°F/82°C	0.784	0.754	0.725
1°F/-17°C	33.725	32.105	30.561	91°F/33°C	3.784	3.697	3.611	181°F/83°C	0.762	0.733	0.705
3°F/-16°C	32.033	30.520	29.077	93°F/34°C	3.649	3.564	3.479	183°F/84°C	0.742	0.713	0.685
5°F/-15°C	30.437	29.023	27.673	95°F/35°C	3.520	3.436	3.353	185°F/85°C	0.721	0.693	0.666
7°F/-14°C	28.931	27.609	26.347	97°F/36°C	3.395	3.313	3.232	187°F/86°C	0.701	0.674	0.647
9°F/-13°C	27.508	26.273	25.092	99°F/37°C	3.275	3.195	3.116	189°F/87°C	0.682	0.655	0.629
10°F/-12°C	26.165	25.010	23.905	100°F/38°C	3.161	3.082	3.004	190°F/88°C	0.664	0.638	0.613
12°F/-11°C	24.896	23.816	22.782	102°F/39°C	3.051	2.974	2.898	192°F/89°C	0.646	0.620	0.595
14°F/-10°C	23.697	22.687	21.720	104°F/40°C	2.946	2.870	2.795	194°F/90°C	0.629	0.604	0.580
16°F/-9°C	22.562	21.618	20.713	106°F/41°C	2.844	2.770	2.697	196°F/91°C	0.611	0.587	0.563
18°F/-8°C	21.490	20.607	19.759	108°F/42°C	2.748	2.675	2.604	198°F/92°C	0.596	0.572	0.549
19°F/-7°C	20.475	19.649	18.855	109°F/43°C	2.654	2.583	2.513	199°F/93°C	0.580	0.557	0.534
21°F/-6°C	19.515	18.742	17.999	111°F/44°C	2.564	2.494	2.426	201°F/94°C	0.565	0.542	0.520
23°F/-5°C	18.606	17.883	17.187	113°F/45°C	2.478	2.410	2.343	203°F/95°C	0.550	0.528	0.506
25°F/-4°C	17.745	17.068	16.416	115°F/46°C	2.395	2.328	2.263	205°F/96°C	0.536	0.514	0.493
27°F/-3°C	16.930	16.296	15.685	117°F/47°C	2.315	2.250	2.186	207°F/97°C	0.522	0.501	0.480
28°F/-2°C	16.156	15.563	14.991	118°F/48°C	2.238	2.174	2.111	208°F/98°C	0.509	0.488	0.468
30°F/-1°C	15.423	14.868	14.332	120°F/49°C	2.164	2.102	2.041	210°F/99°C	0.497	0.476	0.456
32°F/0°C	14.792	14.270	13.766	122°F/50°C	2.093	2.032	1.972	212°F/100°C	0.484	0.464	0.444
34°F/1°C	14.069	13.582	13.111	124°F/51°C	2.025	1.965	1.906	214°F/101°C	0.472	0.452	0.433
36°F/2°C	13.443	12.987	12.546	126°F/52°C	1.959	1.901	1.844	216°F/102°C	0.460	0.441	0.422
37°F/3°C	12.849	12.422	12.008	127°F/53°C	1.896	1.839	1.783	217°F/103°C	0.449	0.430	0.412
39°F/4°C	12.284	11.885	11.497	129°F/54°C	1.835	1.779	1.724	219°F/104°C	0.437	0.419	0.401
41°F/5°C	11.749	11.375	11.012	131°F/55°C	1.776	1.721	1.668	221°F/105°C	0.427	0.409	0.391
43°F/6°C	11.239	10.889	10.548	133°F/56°C	1.719	1.666	1.614	223°F/106°C	0.416	0.399	0.381
45°F/7°C	10.756	10.428	10.109	135°F/57°C	1.665	1.613	1.562	225°F/107°C	0.406	0.388	0.372

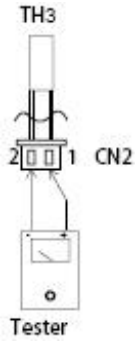
46°F/8°C	10.295	9.988	9.689	136°F/58°C	1.613	1.562	1.512	226°F/108°C	0.395	0.379	0.362
48°F/9°C	9.858	9.570	9.289	138°F/59°C	1.562	1.512	1.463	228°F/109°C	0.386	0.369	0.353
50°F/10°C	9.441	9.172	8.909	140°F/60°C	1.514	1.465	1.417	230°F/110°C	0.376	0.360	0.344
52°F/11°C	9.044	8.792	8.545	142°F/61°C	1.467	1.419	1.372	232°F/111°C	0.367	0.351	0.335
54°F/12°C	8.667	8.431	8.199	144°F/62°C	1.421	1.374	1.328	234°F/112°C	0.357	0.342	0.327
55°F/13°C	8.308	8.087	7.870	145°F/63°C	1.378	1.332	1.287	235°F/113°C	0.349	0.333	0.319
57°F/14°C	7.965	7.758	7.554	147°F/64°C	1.336	1.291	1.247	237°F/114°C	0.340	0.325	0.311
59°F/15°C	7.639	7.445	7.254	149°F/65°C	1.295	1.251	1.208	239°F/115°C	0.332	0.317	0.303
61°F/16°C	7.329	7.147	6.968	151°F/66°C	1.256	1.213	1.171	241°F/116°C	0.324	0.309	0.296
63°F/17°C	7.032	6.862	6.694	153°F/67°C	1.218	1.176	1.135	243°F/117°C	0.316	0.302	0.288
64°F/18°C	6.749	6.590	6.433	154°F/68°C	1.181	1.140	1.100	244°F/118°C	0.308	0.294	0.281
66°F/19°C	6.480	6.331	6.183	156°F/69°C	1.146	1.106	1.067	246°F/119°C	0.301	0.287	0.274
								228°F/120°C	0.293	0.280	0.268

Outdoor Unit Sensor Temperature Characteristics

Temp. °F/°C	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)	Temp. °F/°C	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)	Temp. °F/°C	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)
-22°F/-30°C	283.3	322.9	367.7	75°F/24°C	19.36	20.89	22.52	172°F/78°C	2.563	2.654	2.745
-20°F/-29°C	267.4	304.4	346.3	77°F/25°C	18.55	20	21.54	174°F/79°C	2.481	2.567	2.654
-18°F/-28°C	252.5	287.1	307.4	79°F/26°C	17.77	19.14	20.6	176°F/80°C	2.402	2.484	2.567
-17°F/-27°C	238.5	270.9	307.4	81°F/27°C	17.03	18.32	19.7	178°F/81°C	2.327	2.404	2.483
-15°F/-26°C	225.4	255.7	289.8	82°F/28°C	16.32	17.55	18.85	180°F/82°C	2.254	2.327	2.401
-13°F/-25°C	213.1	241.4	273.3	84°F/29°C	15.65	16.81	18.04	181°F/83°C	2.183	2.253	2.323
-11°F/-24°C	201.5	228	257.9	86°F/30°C	15	16.1	17.27	183°F/84°C	2.115	2.182	2.248
-9°F/-23°C	190.6	215.5	243.4	88°F/31°C	14.39	15.43	16.54	185°F/85°C	2.05	2.113	2.176
-8°F/-22°C	180.3	203.6	229.8	90°F/32°C	13.81	14.79	15.34	187°F/86°C	1.985	2.047	2.109
-6°F/-21°C	170.7	192.5	217	91°F/33°C	13.25	14.18	15.17	189°F/87°C	1.922	1.983	2.045
-4°F/-20°C	161.6	182.1	205	93°F/34°C	12.72	13.6	14.54	190°F/88°C	1.861	1.922	1.983
-2°F/-19°C	153.1	172.3	193.7	95°F/35°C	12.21	13.05	13.93	192°F/89°C	1.802	1.862	1.923
0°F/-18°C	145	163.1	183.2	97°F/36°C	11.72	12.52	13.36	194°F/90°C	1.746	1.805	1.865
1°F/-17°C	137.5	154.4	173.2	99°F/37°C	11.26	12.01	12.81	196°F/91°C	1.692	1.75	1.809
3°F/-16°C	130.3	146.2	163.9	100°F/38°C	10.82	11.53	12.29	198°F/92°C	1.639	1.697	1.755
5°F/-15°C	123.6	138.5	155.1	102°F/39°C	10.29	11.07	11.78	199°F/93°C	1.589	1.646	1.703
7°F/-14°C	117.3	131.3	146.8	104°F/40°C	9.986	10.63	11.31	201°F/94°C	1.54	1.596	1.653
9°F/-13°C	111.3	124.4	139	106°F/41°C	9.6	10.21	10.85	203°F/95°C	1.493	1.549	1.604
10°F/-12°C	105.6	118	131.7	108°F/42°C	9.231	9.813	10.42	205°F/96°C	1.448	1.502	1.558
12°F/-11°C	100.3	111.9	124.7	109°F/43°C	8.878	9.43	10	207°F/97°C	1.404	1.458	1.512
14°F/-10°C	95.24	106.2	118.2	111°F/44°C	8.54	9.064	9.612	208°F/98°C	1.362	1.415	1.469
16°F/-9°C	90.49	100.8	112.1	113°F/45°C	8.217	8.714	9.233	210°F/99°C	1.321	1.373	1.426
18°F/-8°C	85.99	95.68	106.3	115°F/46°C	7.908	8.38	8.872	212°F/100°C	1.284	1.335	1.387
19°F/-7°C	81.75	90.86	100.8	117°F/47°C	7.612	8.06	8.526	214°F/101°C	1.245	1.296	1.348
21°F/-6°C	77.74	86.31	95.74	118°F/48°C	7.328	7.754	8.196	216°F/102°C	1.209	1.258	1.309
23°F/-5°C	73.94	82.01	90.88	120°F/49°C	7.057	7.461	7.88	217°F/103°C	1.173	1.222	1.272
25°F/-4°C	70.35	77.95	86.29	122°F/50°C	6.797	7.18	7.578	219°F/104°C	1.139	1.187	1.236
27°F/-3°C	66.96	74.11	81.96	124°F/51°C	6.548	6.912	7.289	221°F/105°C	1.105	1.153	1.202
28°F/-2°C	63.74	70.48	77.87	126°F/52°C	6.309	6.655	7.013	223°F/106°C	1.073	1.12	1.168

30°F/-1°C	60.69	67.05	74	127°F/53°C	6.08	6.409	6.748	225°F/107°C	1.042	1.089	1.136
32°F/0°C	57.81	63.8	70.34	129°F/54°C	5.861	6.173	6.495	226°F/108°C	1.013	1.058	1.104
34°F/1°C	55.08	60.72	66.88	131°F/55°C	5.651	5.947	6.253	228°F/109°C	0.9833	1.028	1.074
36°F/2°C	52.49	57.81	63.61	133°F/56°C	5.449	5.73	6.02	230°F/110°C	0.9553	0.9997	1.045
37°F/3°C	50.03	55.05	60.52	135°F/57°C	5.255	5.522	5.798	232°F/111°C	0.9283	0.9719	1.016
39°F/4°C	47.71	52.44	57.59	136°F/58°C	5.07	5.323	5.585	234°F/112°C	0.9021	0.9451	0.9892
41°F/5°C	45.5	49.97	54.82	138°F/59°C	4.891	5.132	5.381	235°F/113°C	0.8765	0.9191	0.9626
43°F/6°C	43.41	47.62	52.2	140°F/60°C	4.72	4.949	5.101	237°F/114°C	0.8524	0.894	0.9367
45°F/7°C	41.42	45.4	49.71	142°F/61°C	4.556	4.774	4.997	239°F/115°C	0.8087	0.8595	0.9117
46°F/8°C	39.53	43.2	42.33	144°F/62°C	4.398	4.605	4.817	241°F/116°C	0.8059	0.8461	0.8875
48°F/9°C	37.74	41.29	45.12	145°F/63°C	4.247	4.448	4.644	243°F/117°C	0.7837	0.8233	0.8641
50°F/10°C	36.04	39.39	43.01	147°F/64°C	4.101	4.288	4.479	244°F/118°C	0.7623	0.8012	0.8413
52°F/11°C	34.42	37.59	41	149°F/65°C	3.961	4.139	4.32	246°F/119°C	0.7415	0.7798	0.8193
54°F/12°C	32.89	35.87	39.1	151°F/67°C	3.827	3.995	4.167	248°F/120°C			
55°F/13°C	31.43	34.25	37.29	153°F/67°C	3.698	3.858	4.021	250°F/121°C	0.702	0.7386	0.7773
57°F/14°C	30.04	32.71	35.58	154°F/68°C				252°F/122°C	0.6631	0.7195	0.7572
59°F/15°C	29.72	31.24	33.95	156°F/69°C				253°F/123°C	0.6649	0.7007	0.7378
61°F/16°C				158°F/70°C	3.339	3.476	3.616	255°F/124°C	0.6472	0.6824	0.7189
63°F/17°C				160°F/71°C	3.229	3.359	3.491	257°F/125°C	0.6301	0.6647	0.7006
64°F/18°C	25.13	27.26	29.55	162°F/72°C	3.122	3.246	3.372	259°F/126°C	0.6135	0.6476	0.6829
66°F/19°C	24.05	26.07	28.23	163°F/73°C	3.02	3.138	3.257	261°F/127°C	0.5974	0.6309	0.6657
68°F/20°C	23.02	24.93	26.97	165°F/74°C	2.921	3.033	3.146	262°F/128°C	0.5818	0.6148	0.649
70°F/21°C	22.04	23.84	25.77	167°F/75°C	2.827	2.933	3.04	264°F/129°C	0.5667	0.5991	0.6328
72°F/22°C	21.1	22.81	24.63	169°F/76°C	2.735	2.836	2.938	266°F/130°C	0.5521	0.5839	0.6171
73°F/23°C	20.21	21.83	23.55	171°F/77°C	2.647	2.743	2.84				

R—Resistance
Resistance at (77°F) 25°C: 20 kΩ



TH3: Outdoor unit discharge pipe sensor

Before measuring resistance, disconnect the connectors as shown above.

Temperature/Pressure List of Refrigerant

R-454B					
Pressure	**Temperature**	**Pressure**	**Temperature**	**Pressure**	**Temperature**
Kpa	**°F/°C**	**Kpa**	**°F/°C**	**Kpa**	**°F/°C**
100	-59.4°F/-50.8°C	1250	61.9°F/16.6°C	2400	107.4°F/41.9°C
150	-44.3°F/-42.4°C	1300	64.4°F/18°C	2450	108.9°F/ 42.7°C
200	-32.6°F/-35.9°C	1350	66.9°F/19.4°C	2500	110.5°F/43.6°C
250	-23.3°F/-30.7°C	1400	69.3°F/20.7°C	2550	111.92°F/44.4°C
300	-15.2°F/-26.2°C	1450	71.6°F/22°C	2600	113.4°F/45.2°C
350	-8°F/-22.2°C	1500	73.9°F/23.3°C	2650	115°F/46.1°C
400	-1.7°F/-18.7°C	1550	76.1°F/24.5°C	2700	116.4°F/46.9°C
450	4.1°F/-15.5°C	1600	78.3°F/25.7°C	2750	117.9°F/47.7°C
500	9.5°F/-12.5°C	1650	80.4°F/26.9°C	2800	119.1°F/48.4°C
550	14.4°F/-9.8°C	1700	82.4°F/28°C	2850	120.6°F/49.2°C
600	19°F/-7.2°C	1750	84.2°F/29°C	2900	122°F/50°C
650	23.4°F/-4.8°C	1800	86.4°F/30.2°C	2950	123.3°F/50.7°C
700	27.3°F/-2.6°C	1850	88.3°F/31.3°C	3000	124.7°F/51.5°C
750	31.3°F/-0.4°C	1900	90.1°F/32.3°C	3050	126°F/52.2°C
800	34.9°F/1.6°C	1950	92.1°F/33.4°C	3100	127.2°F/52.9°C
850	38.5°F/3.6°C	2000	93.9°F/34.4°C	3150	128.5°F/53.6°C
900	41.7°F/5.4°C	2050	95.7°F/35.4°C	3200	129.7°F/54.3°C
950	45°F/7.2°C	2100	97.3°F/36.3°C	3250	131°F/55°C
1000	48°F/8.9°C	2150	99.1°F/37.3°C	3300	132.3°F/55.7°C
1050	51.1°F/10.6°C	2200	100.8°F/38.2°C	3350	133.5°F/56.4°C
1100	54°F/12.2°C	2250	102.6°F/39.2°C	3400	134.8°F/57.1°C
1150	56.7°F/13.7°C	2300	104.2°F/40.1°C	3450	136°F/57.8°C
1200	59.4°F/15.2°C	2350	105.8°F/41°C	3500	137°F/58.4°C

Refrigerant Notice/Concentration

The refrigerant fill weight and room area requirements for air conditioner installation are detailed in Tables GG.1 and GG.2.

The maximum charge and the required minimum floor area
$m_1 = (6m^3) \times LFL$, $m_2 = (52m^3) \times LFL$, $m_3 = (260m^3) \times LFL$
Where LFL is the lower flammable limit in kg/m^3,R454B LFL is $0.296kg/m^3$.
For the appliances with a charge amount $m_1 < M = m_2$:
The maximum charge in a room shall be in accordance with the following:
$m_{max} = 2.5 \times (LFL)^{5/4} \times h_0 \times (A)^{1/2}$
The required minimum floor area A min to install an appliance with refrigerant charge M(kg) shall be in accordance with following: $A_{min} = (M / (2.5 \times (LFL)^{5/4} \times h_0))^2$

Where:

Table GG.1 - Maximum Charge (kg)

Category	LFL(kg/m3)	h0(m)	Floor Area (m3)						
			4	7	10	15	20	30	50
R454B	0.296	1	0.6	1.04	1.48	2.11	2.44	2.99	3.86
		1.8	1.1	1.86	2.66	3.81	4.39	5.38	6.95
		2.2	1.3	2.28	3.26	4.65	5.37	6.58	8.49
		2.5	1.5	2.59	3.70	5.28	6.10	7.47	9.65

Table GG.2 - Minimum Room Area (m^2)

Category	LFL(kg/m3)	h0(m)	Charge Amount (M) (kg) Minimum Room Area (m2)						
R454B	0.296		1.224kg	1.836kg	2.448kg	3.672kg	4.896kg	6.12kg	7.956kg
		0.6	/	31	56	126	223	349	590
		1	/	12	20	45	80	126	212
		1.8	/	7	9	14	25	39	66
		2.2	/	6	8	11	17	26	44

Operation Tools

The following tools will be used:
1. Liquid-level gauge
2. Screwdriver
3. Electric driven rotary hammer
4. Drill
5. Pipe expander
6. Torque wrench
7. Open-end wrench
8. Pipe cutter
9. Leak detector
10. Vacuum pump
11. Pressure gauge
12. Universal meter
13. Hexagon wrench
14. Tapeline