

# SERVICE MANUAL

FLOOR STANDING TYPE

# **1 .Safety Precautions**

## **1.1 Precaution**

To prevent injury to the user or other people and property damage, the following instructions must be followed.

Incorrect operation due to ignoring instruction will cause harm or damage.

Before service unit, be sure to read this service manual at first.

## **1.2 Installation**

For electrical work, contact the dealer, seller, a qualified electrician, or an Authorized service center.

Do not disassemble or repair the product by yourself.

Sharp edges could cause injury, be especially careful of the case edges and the fins on the condenser and evaporator.

Be sure the installation area does not deteriorate with age.

Take care to ensure that power cable could not be pulled out or damaged during operation.

Do not place anything on the power cable.

Do not plug or unplug the power supply plug during operation.

Do not store or use flammable gas or combustible near the product.

When flammable gas leaks, turn off the gas and open a window for ventilation before turn the product on.

If strange sounds, or small or smoke comes from product. Turn the breaker off or disconnect the power supply cable as soon as possible.

When the product is soaked (flooded or submerged), contact an Authorized service center.

Be caution that water could not enter the product.

Turn the main power off when cleaning or maintaining the product.

When the product is not be used for a long time, disconnect the power supply plug or turn off the breaker.

## **1.3 Caution**

Always check for gas (refrigerant) leakage after installation or repair of product.

Install the drain hose to ensure that water is drained away properly.

Keep level even when installing the product.

Do not install the product where the noise or hot air from the outdoor unit could damage the neighborhoods.

Use two or more people to lift and transport the product.

Do not install the product where it will be exposed to sea wind (salt spray) directly.

## 1.4 Operational

Do not expose the skin directly to cool air for long periods of time. (Do not sit in the draft).

Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigerant system.

Do not block the inlet or outlet of air flow.

Use a soft cloth to clean. Do not use harsh detergents, solvents, etc.

Do not touch the metal parts of the product when removing the air filter. They are very sharp.

Do not step on or put anything on the product. (outdoor units)

Always insert the filter securely. Clean the filter every two weeks or more often if necessary.

Do not insert hands or other object through air inlet or outlet while the product is operated.

Do not drink the water drained from the product.

Use a firm stool or ladder when cleaning or maintaining the product.

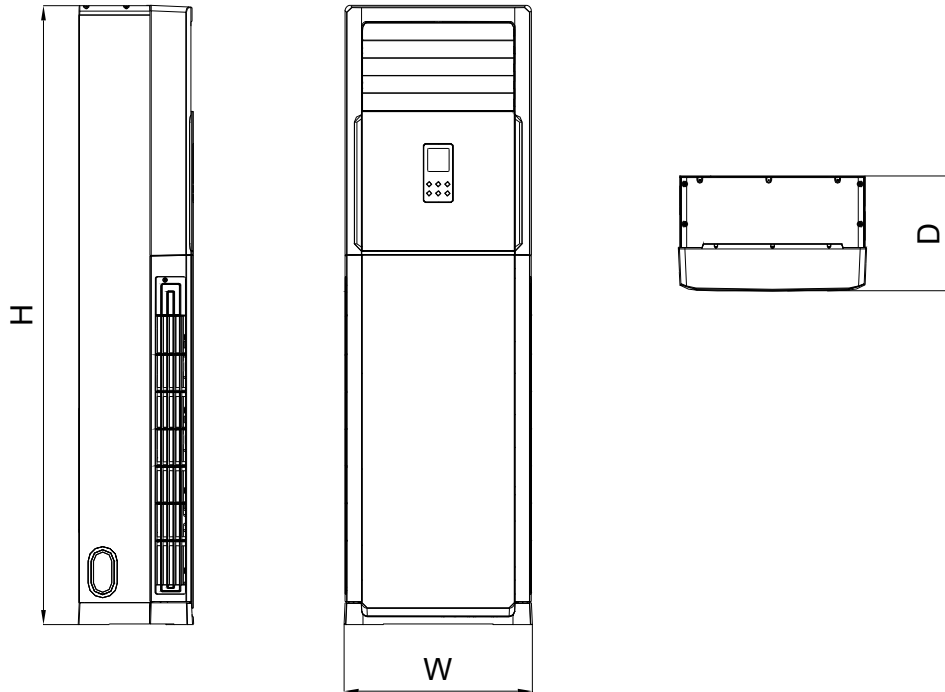
Replace the all batteries in the remote control with new ones of the same type. Do not mix old and new batteries or different types of batteries.

Do not recharge or disassemble the batteries. Do not dispose of batteries in a fire.

If the liquid from the batteries gets onto your skin or clothes, wash it well with clean water. Do not use the remote if the batteries have leaked.

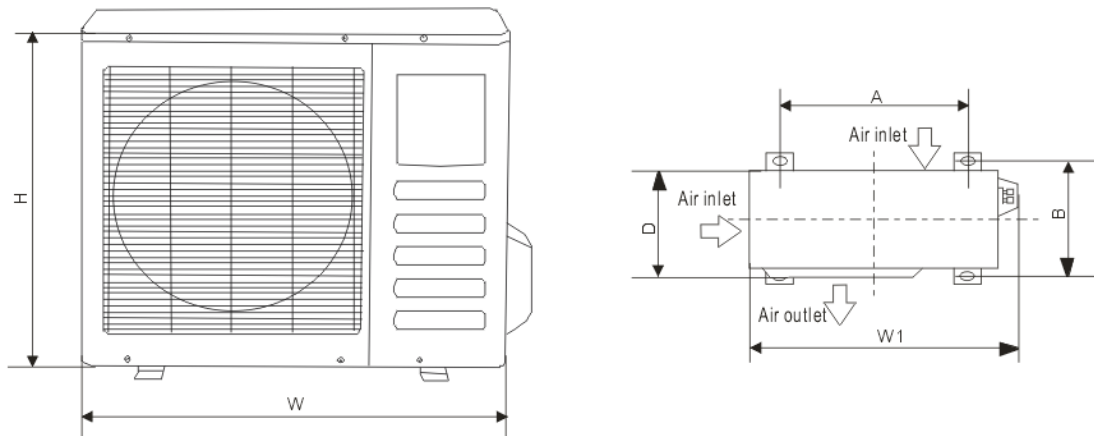
## 2 .Dimension

### 2.1 Indoor Unit

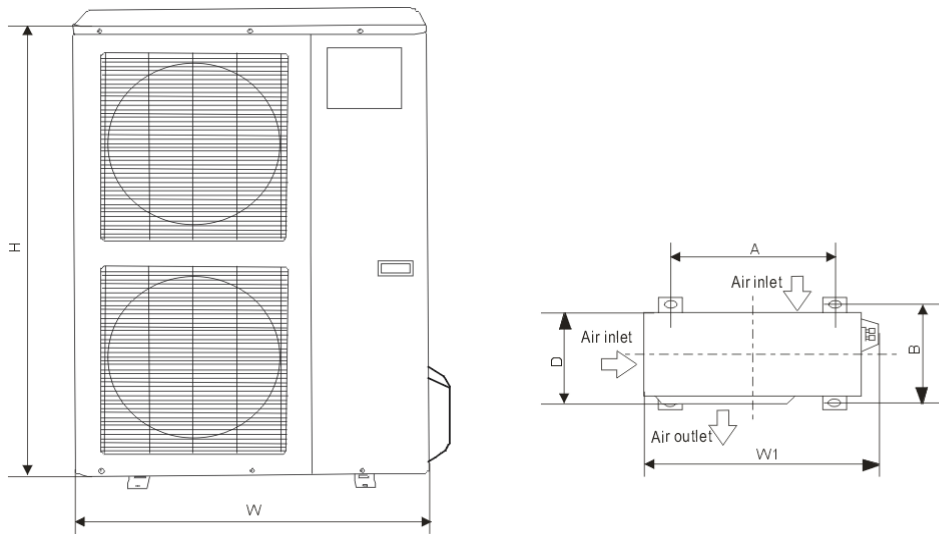


Mode \ Dimension	W(mm)	D(mm)	H(mm)
MDFM-24ARN1	500	315	1700
MDFM-48ARN1	550	418	1824
MDFM-60ARN1	600	455	1934

## 2.2 Outdoor Unit



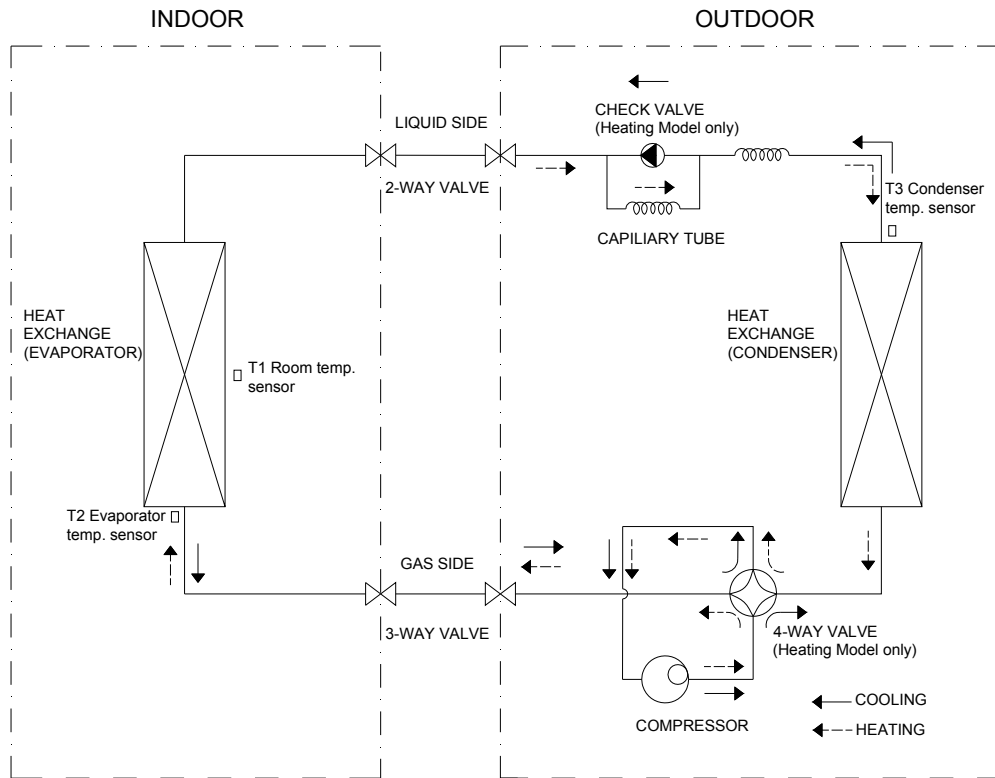
Dimension Mode	W(mm)	D(mm)	H(mm)	W1(mm)	A(mm)	B(mm)
MDOFM-24HN1	845	320	700	908	560	335



Mode	Dimension	W(mm)	D(mm)	H(mm)	W1(mm)	A(mm)	B(mm)
MDOFM-48HN1		900	350	1170	985	590	378
MDOFM-60HN1		900	350	1170	985	590	378

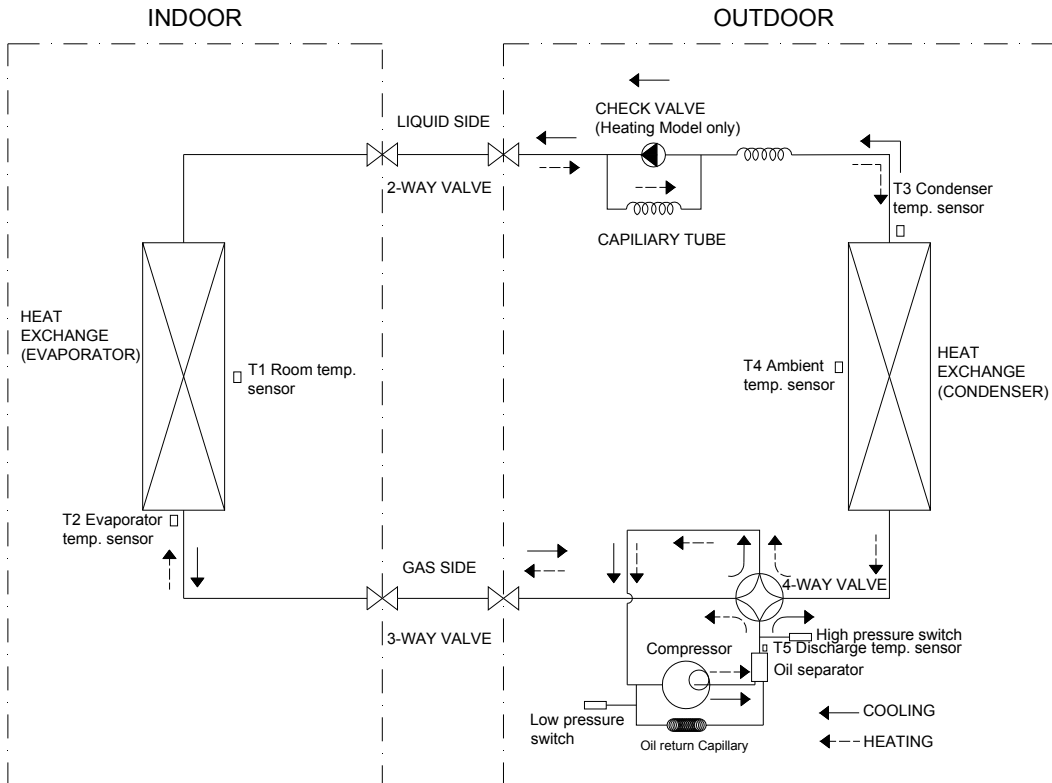
### 3.Refrigerant cycle diagram

MDFM-24ARN1



MDFM-48ARN1

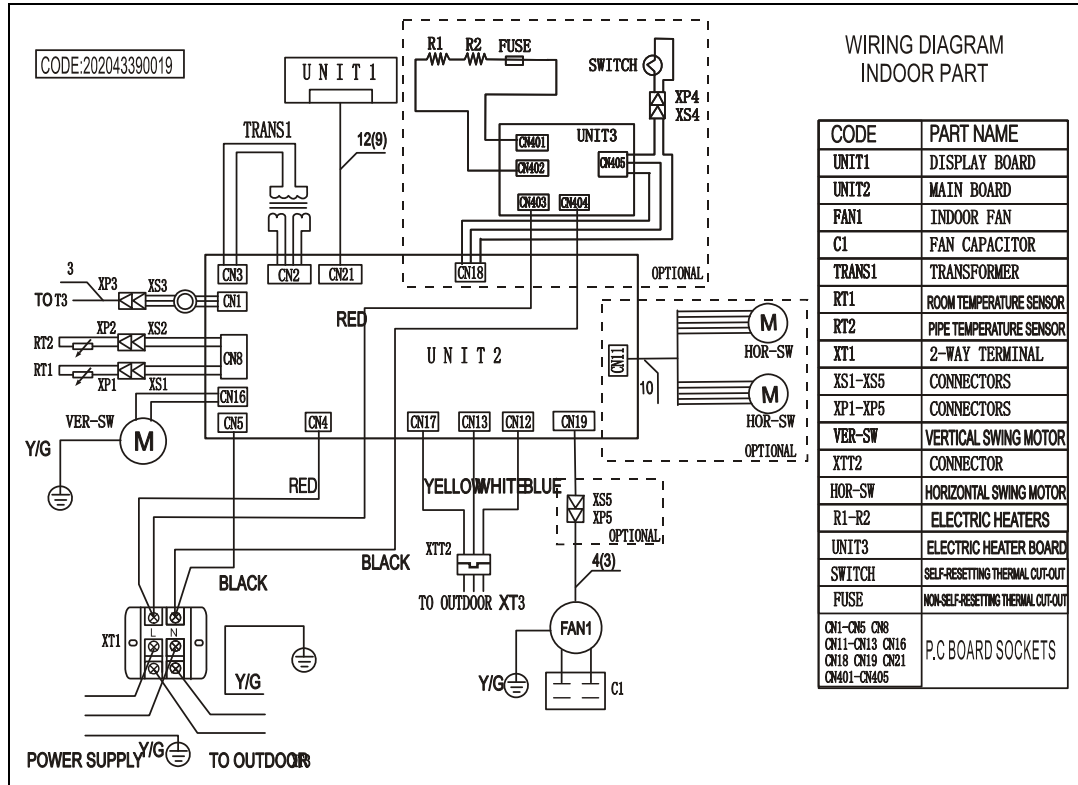
MDFM-60ARN1



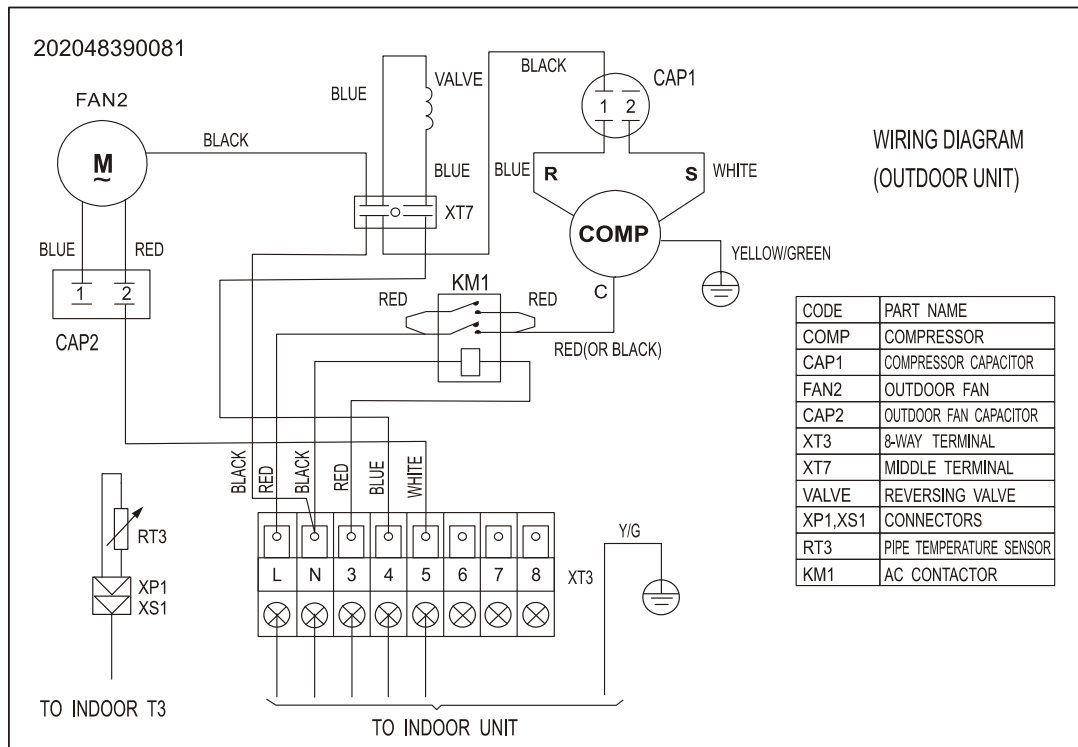
## 4 . Wiring diagram

MDFM-24ARN1

Indoor unit:



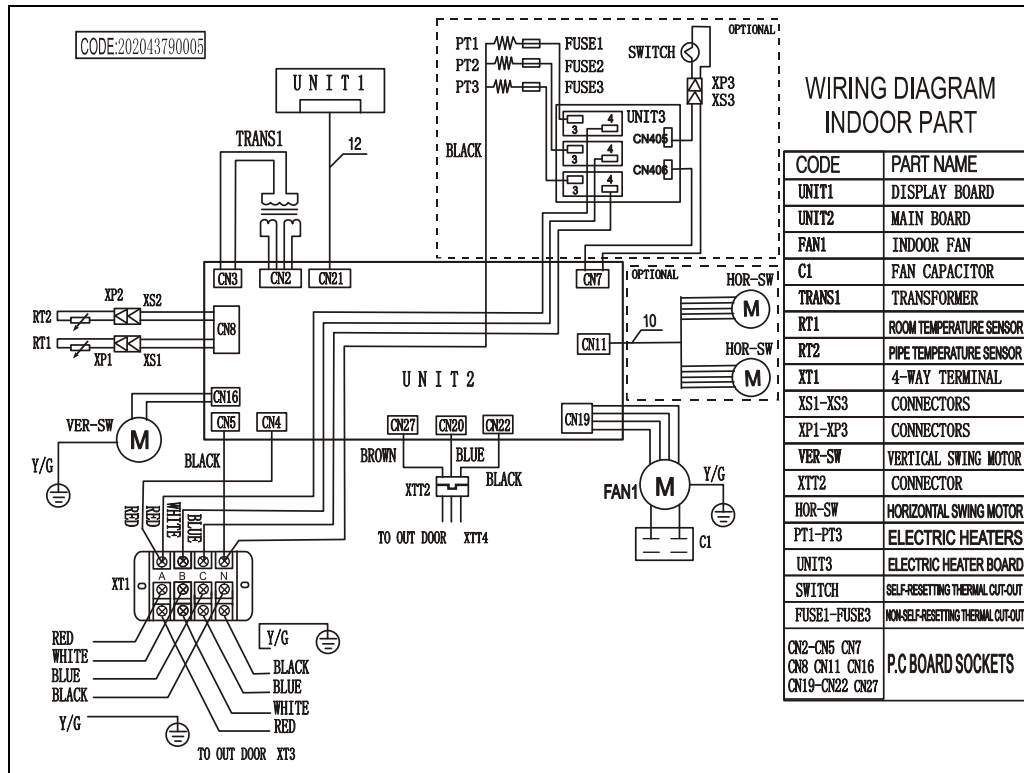
Outdoor unit:



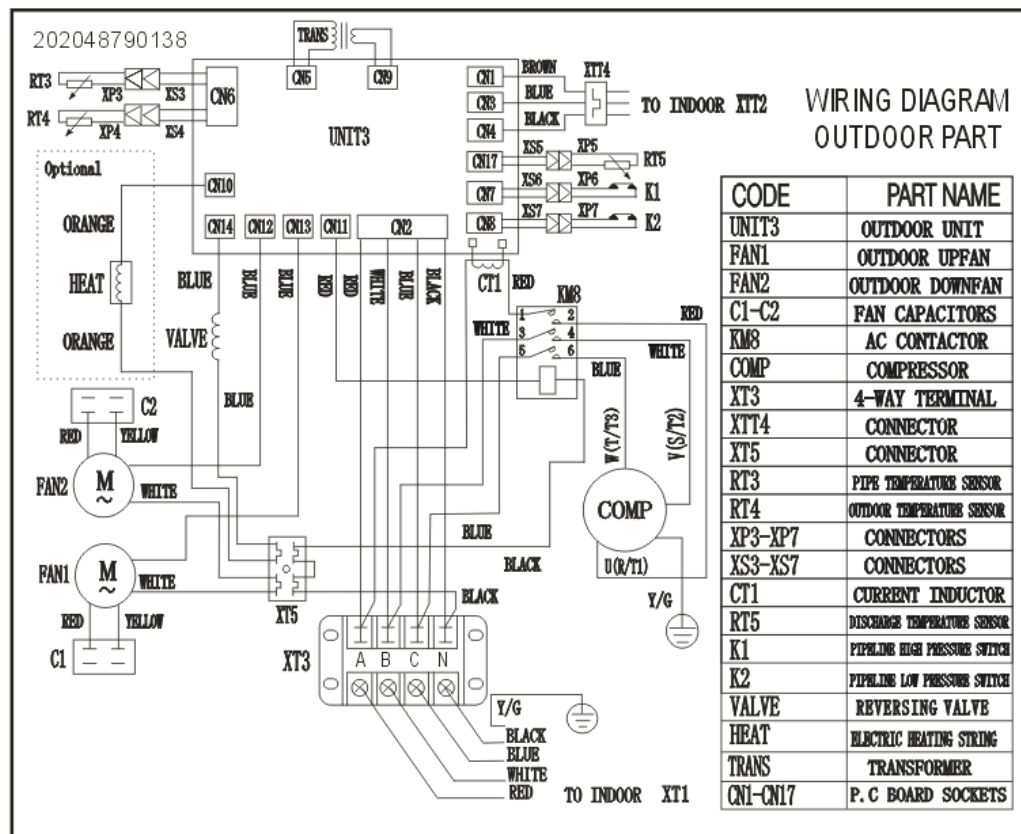


MDFM-48ARN1

Indoor unit:

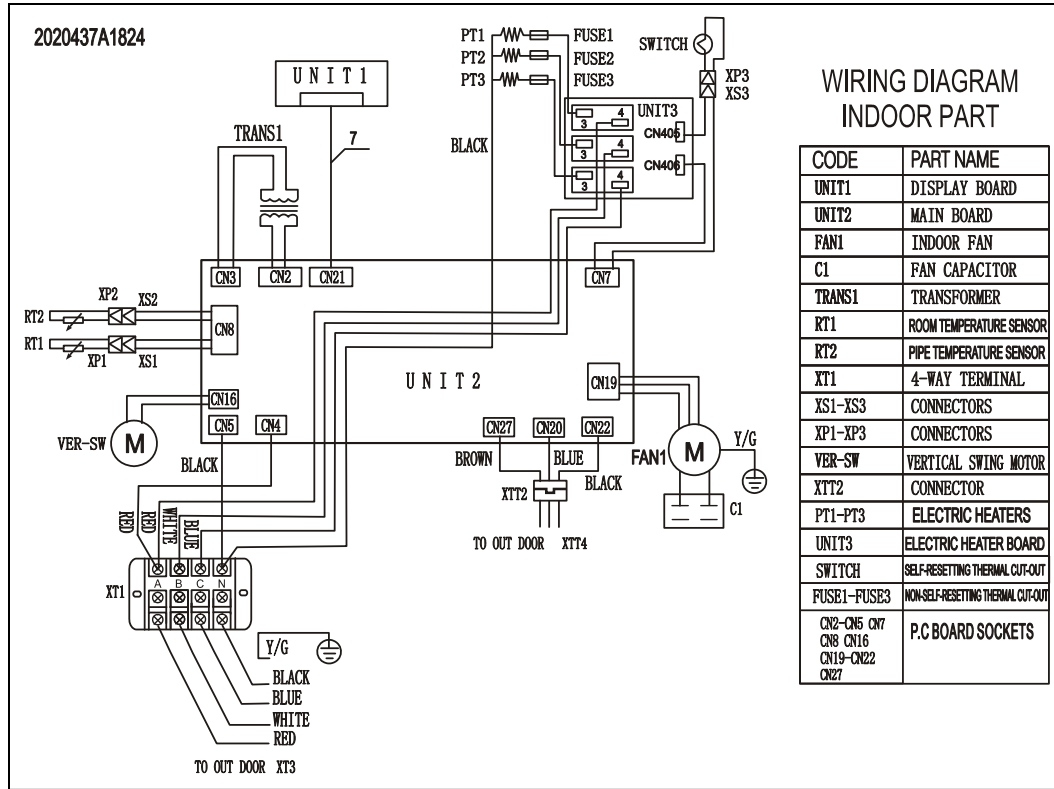


Outdoor unit:

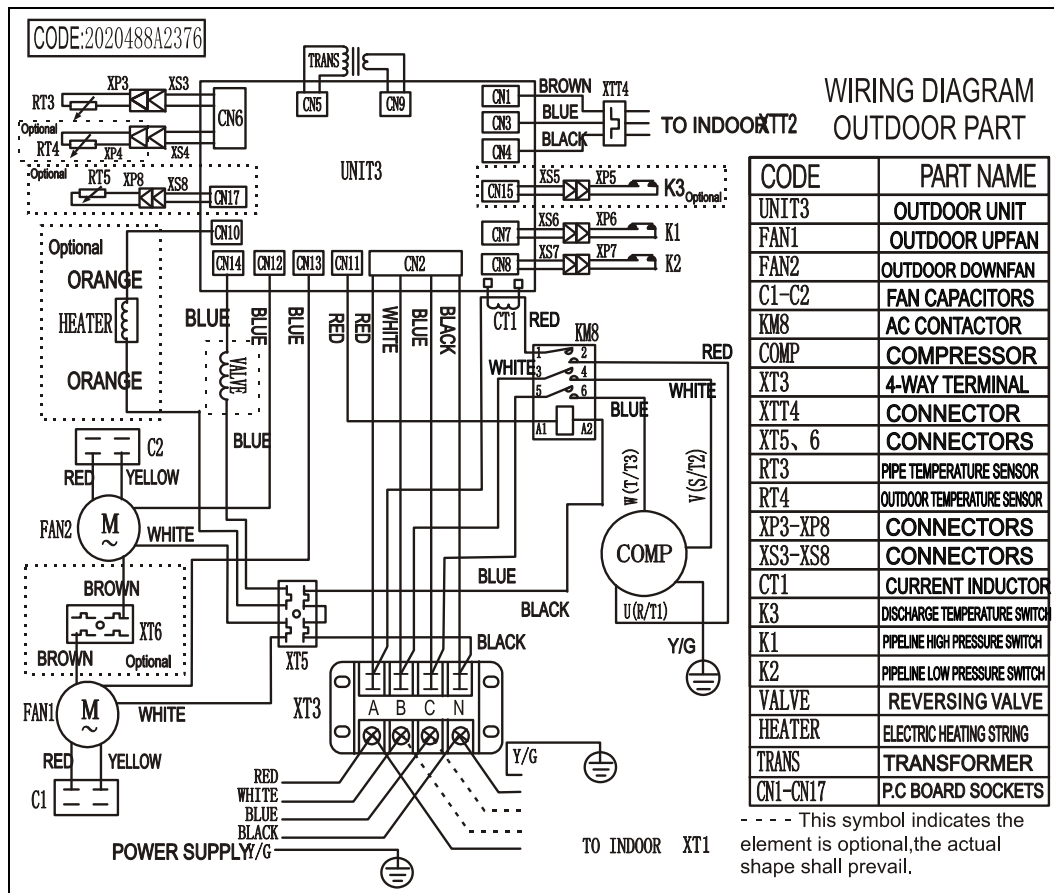


MDFM-60ARN1

Indoor unit:



Outdoor unit:



## 5. Installation details

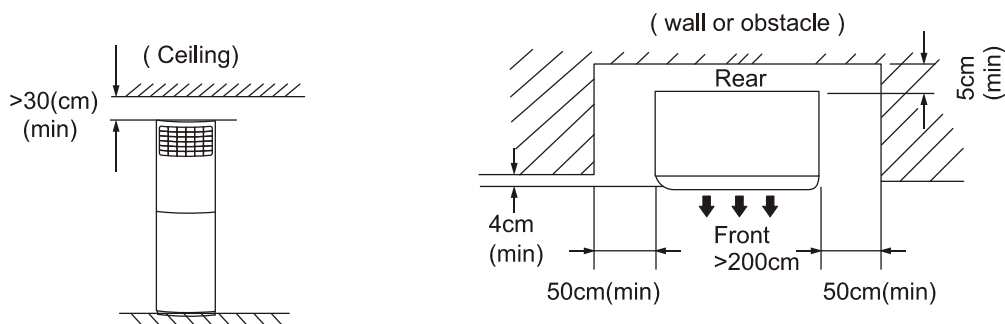
### 5.1 Installation place

#### 5.1.1 Indoor Unit

- a. A place which provides the spaces around the indoor unit as required above in the diagram.
- b. A place where is no obstacle near the inlet and outlet area.
- c. A place which can bear the weight of the indoor unit.
- d. A place which allows the air filter to be removed downward.
- e. A place where the reception range is not exposed to direct sunlight.
- f. In the center of the room where possible.

5.1.1.1 Please stand the unit in hard and flat ground;

Please reserve space for installation and maintenance.



Note: All the pictures in this manual are for explanation purpose only. They may be slightly different from the air conditioner you purchased(depend on model). The actual shape shall prevail.

#### 5.1.2 Outdoor Unit

5.1.2.1 Before installing the outdoor unit, you should:

- a). Select a place where no direct sunlight or other heat-radioactivity may reach. A sunshade is needed if it is unavoidable.
- b). Select a place that is easy to connect indoor unit's pipe and electric wires.
- c). Avoid a place where combustible gas may leak or stay.
- d). Keep it in mind that water may drain out of the outdoor unit while in "Heat" mode.

Caution:

Installation in the following places may cause trouble. If it is unavoidable to use in such places, please consult with the dealer.

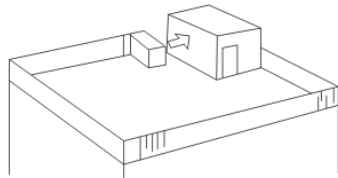
- a. A place full of machine oil.
- b. A saline place such as coast.
- c. Hot-spring resort.
- d. A place full of sulfide gas.
- e. A place where there are high frequency machines such as wireless installation, welding machine, medical facility.
- f. A place of special environmental conditions.

5.1.2.2 If the outdoor unit is to be installed on a roof or where no constructions are around, you should

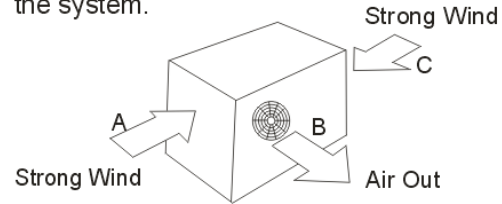
avoid hard wind blows directly to the air outlet, because it may cause trouble for air-flow shortage.

For example:

Let the air outlet face a wall (if there is one) with a distance about 300 centimeters between them.



Try to make the air outlet vertical to wind direction if it is known in the season you use the system.

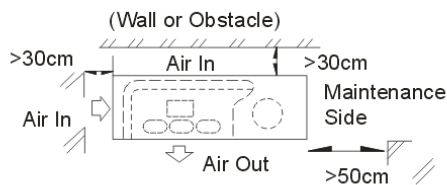


In directions (A), (B), (C), leave open two of the three directions.

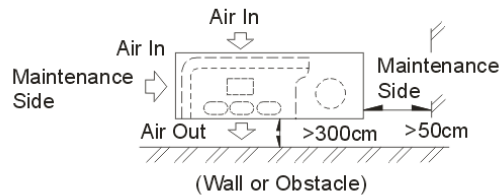
### 5.1.2.3 Reserve enough space for installation, maintenance and unit-functioning.

Remove as many obstacles as possible nearby.

When the air-in surface is facing a wall



When the air-out surface is facing a wall



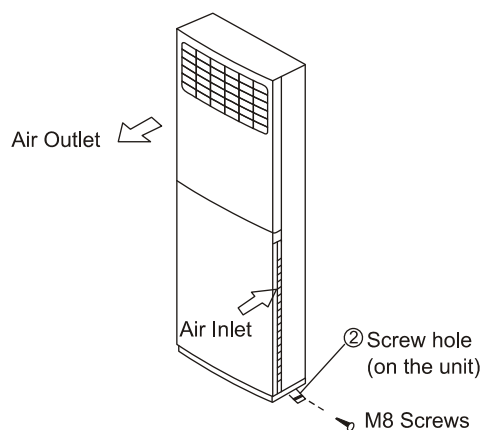
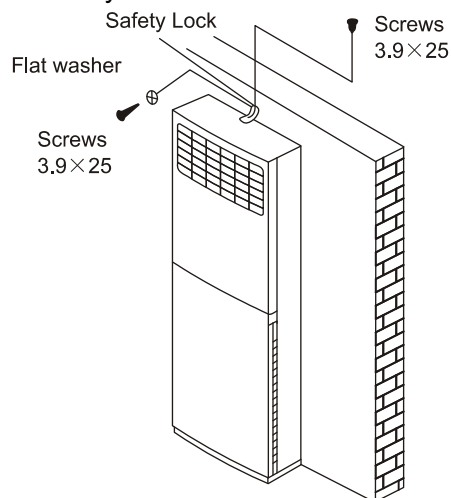
## 5.2 Installing

### 5.2.1 Indoor Unit:

#### 1. Anti-falling;

To prevent the indoor unit from falling, you must:

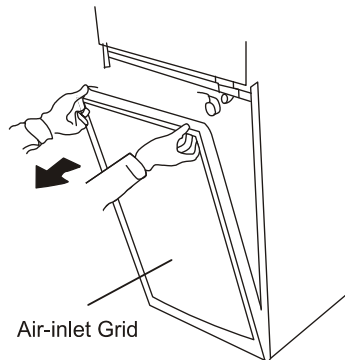
- a. Pay full attention to the unit because its long outer shape makes it easy to fall;
- b. Firmly fix the unit to the wall or in the ground to avoid accidental falling.



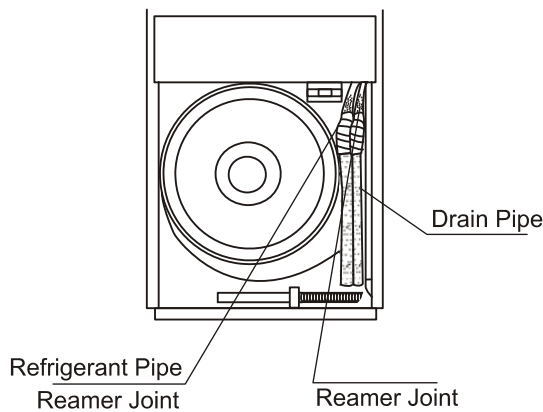
#### 2. Dismounting the air-inlet grid

Please take off the air-inlet grid before connecting the pipes/wires.

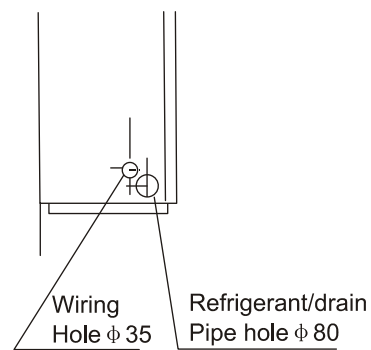
The grid is hitched by a loop inside. To dismantle the air-inlet grid, hold both sides of the grid and pull it up, let it slant downwards until the loop become straight. Then removing the screws fastened the loop with the grid, and the grid goes free.



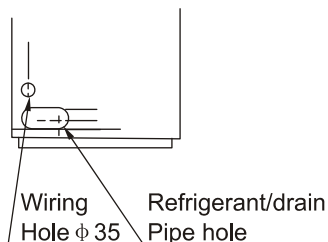
3. Take the pipe clip off before connecting the pipes and wiring; fit it when these finished.  
Use accessories to connect the pipes/wires on both sides and back side.



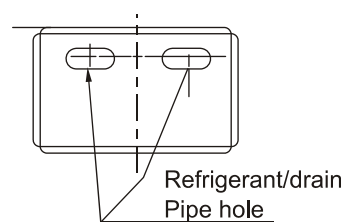
Pipe/wire-hole positions on both sides



Pipe/wire-hole position on back side

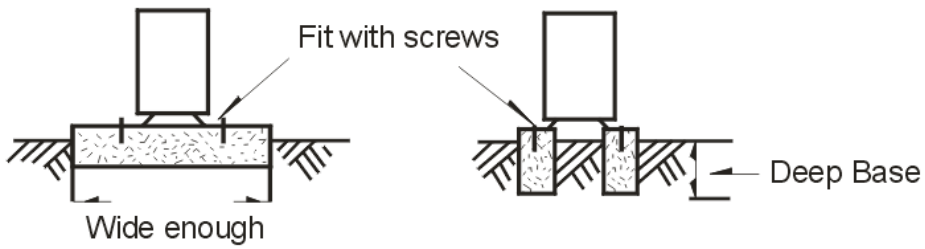


Pipe/wire-hole position on the bottom

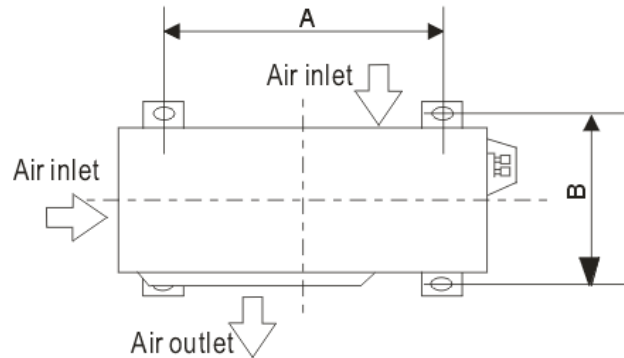


### 5.2.2 Outdoor Unit:

1. Ship the a/c to the installation place originally packed;
2. Be careful while hanging the unit because the center of gravity of the unit is not centralized;
3. Do not make the angle of inclination more than 45 degrees while shipping;(Avoid horizontal storage)
4. Be sure the electric insulation work is well done if installed on metal ceiling / wall.



5. Fix the unit feet with bolts (M10/M8). Be sure the unit is fixed strongly enough to against blast or earthquake.
6. Make a concrete basement to the unit by the following references.



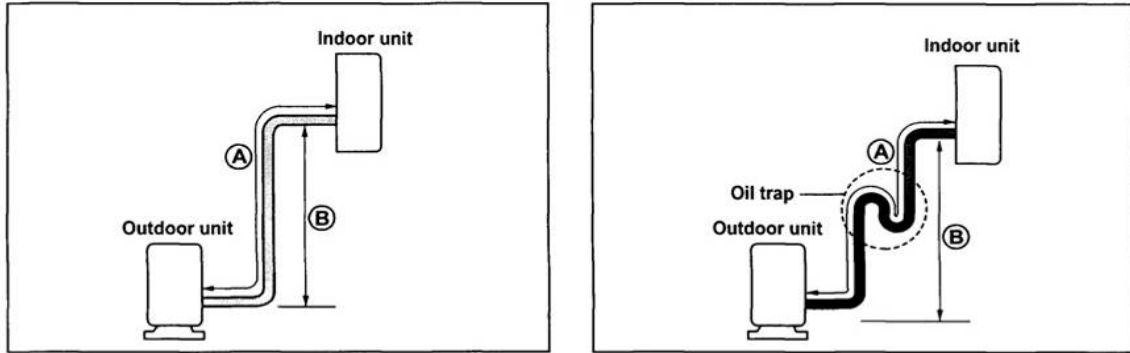
For the value of A and B, please refer to the dimension part.

### 5.3 Refrigerant pipe connection

#### 5.3.1 Pipe length and the elevation

The correct refrigerant quantity filled in the 5-meter-long pipe of the outdoor unit is marked on the Product Data Plate. If you have to use longer pipe for every meter plus pipe, the refrigerant should be added according to the following calculation.

Capacity Btu/h	Pipe size		Standard length (m)	Max. Elevation B (m)	Max. Length A (m)	Additional refrigerant (g/m)
	Gas	Liquid				
MDFM-24ARN1	5/8" (Φ15.9)	3/8" (Φ9.52)	5	10	20	40
MDFM-48ARN1	3/4" (Φ19)	1/2" (Φ12.7)	5	10	20	60
MDFM-60ARN1	3/4"(Φ19)	1/2" (Φ12.7)	5	10	20	60



**Caution:**

Capacity is base on standard length and maximum allowance length is base of reliability.

Oil trap should be installed per 5-7 meters.

**5.3.2 Piping connection**

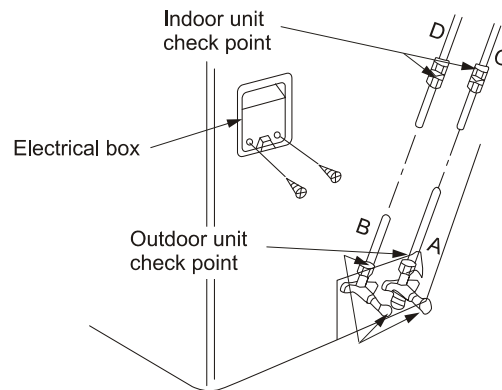
5.3.2.1 Connecting Of Refrigerant Pipe

- a) Only the correctly installing of indoor and outdoor unit done, can the refrigerant pipe be connected.
- b) The cut-off valves are completely close before ex-work. Before connecting the refrigerant pipe, be careful to check whether the valves are completely close.
- c) The connecting procedure of refrigerant pipe: first, unscrew the two valves on the outdoor unit and the pipe-jointing nut on the indoor unit(please keep them carefully). Please connect the refrigerant pipe according to the manual, the pipe-jointing nut should be screw tightly and no leakage. Note: you need two wrenches to make balance.
- d) When the connecting of refrigerant pipe is finished, before power on the system, you should vacuum the indoor unit through the maintenance port on the cut-off valves, or open the high-pressure valve, and exhaust the air through the maintenance port on the low-pressure valve(closed). It will take about ten seconds. Then screw tightly the maintenance port. (When supplement the refrigerant, fill through the maintenance port of the low-pressure valves on the outdoor unit ).
- e) Open all the valves completely before power on the system, or it will be sick for low efficiency.
- f) Gas leak check. Make sure no gas from connections with leak detector or soap water.

**Caution:**

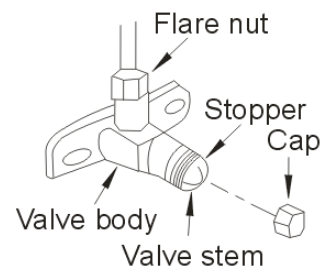
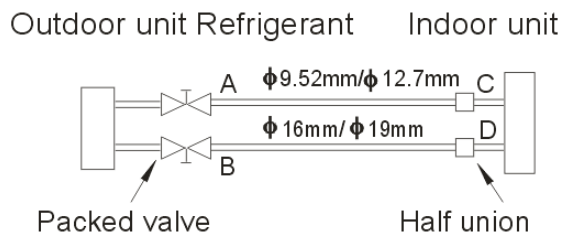
A: Lo packed valve B: Hi packed valve

C and D are ends of indoor unit connection.



### **Caution in Handling the Packed Valve**

- Open the valve stem until it hits against the stopper. Do not try to open it further.
- Securely tighten the valve stem cap with a spanner or the link.



### **Notes for the bendable pipe**

- The bendable pipe should be used on the indoor side;
- Bend angle may not exceed 90 degrees;
- The bend location should be made on the center of the pipe if possible, as for bend radius, the bigger the better;
- The bendable pipe may not be bent for more than 3 times.

### **Bend the thin pipe**

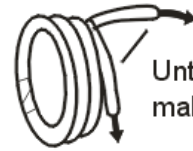
- While bending, expose the pipe by cutting the concave gap on the bending heat-insulation pipe(roll it with soft band after bent).
- To avoid pipe deformation, the radius is the bigger the better.
- Use a pipe-bending device to make the compact bending pipe.



Use thumb to curve the pipe



Min. Radius 100 mm



Untie the pipe, make is straight

### 5.3.2.2 Using bronze pipe selling in market

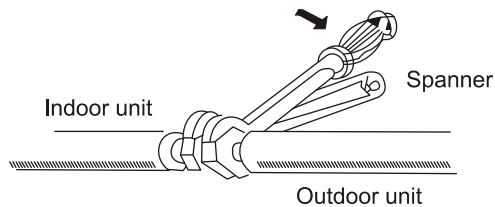
Completely shut the cut-off valves of the outdoor unit (as ex-work status). After the refrigerant pipe has been connected with both the indoor and outdoor unit, let the air exhaust out from the maintenance gap on the low-pressure cut-off valves of the outdoor unit. Screw the nuts tightly on the maintenance gap after the air has been drained.

### 5.3.2.3 To make the refrigerant pipe unblocked completely

You should keep the cut-off valves of the outdoor unit completely open after you have finished the above steps (5.3.2.1 or 5.3.2.2)

Note:

1. Before screwing the reamer nut, smear the pipe and the connecting surface with refrigerant oil;
2. Check and make sure there is no leakage by soap-water or leakage-checker after connecting;
3. Be sure the connecting joint on the indoor side is insulated.
4. Use two wrenches to connecting the pipes.



Outside diameter		Torque	Additional tightening torque
mm	inch	N.cm	N.cm
Φ9.52	3/8	3270	3990
Φ12.7	1/2	4950	6030
Φ16	5/8	6180	7750
Φ19	3/4	9720	11860

### 5.3.3 Installation for the first time

Air and moisture in the refrigerant system have undesirable effects as below:

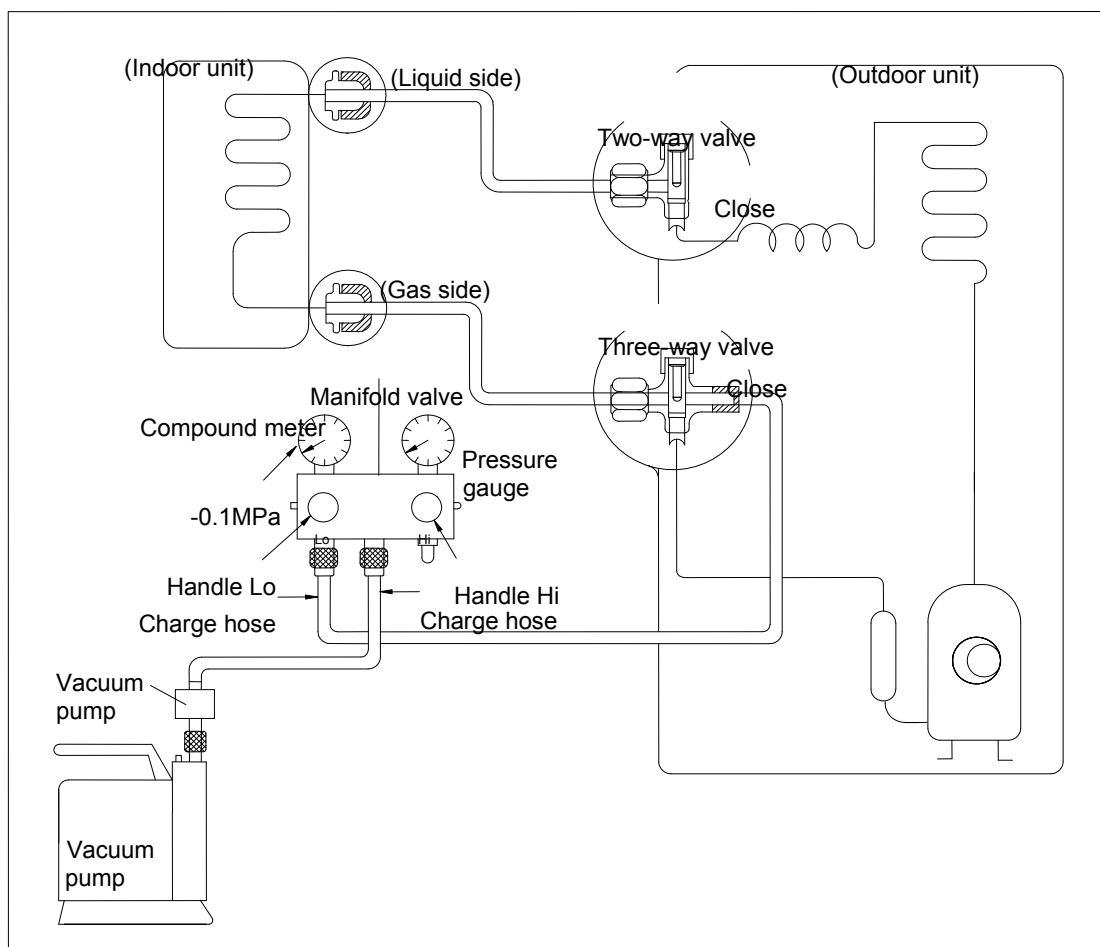
- Pressure in the system rises.
- Operating current rises.
- Cooling or heating efficiency drops.
- Moisture in the refrigerant circuit may freeze and block capillary tubing.
- Water may lead to corrosion of parts in the refrigerant system.

Therefore, the indoor units and the pipes between indoor and outdoor units must be leak tested and evacuated to remove gas and moisture from the system.

Gas leak check (Soap water method):

Apply soap water or a liquid neutral detergent on the indoor unit connections or outdoor unit connections by a soft brush to check for leakage of the connecting points of the piping. If bubbles come out, the pipes have leakage.

#### 1. Air purging with vacuum pump



- 1) Completely tighten the flare nuts of the indoor and outdoor units, confirm that both the 2-way and 3-way valves are set to the closed position.

- 2) Connect the charge hose with the push pin of handle lo to the 3-way valves gas service port..
- 3) Connect the charge hose of handle hi connection to the vacuum pump.
- 4) Fully open the handle Lo of the manifold valve.
- 5) Operate the vacuum pump to evacuate.
- 6) Make evacuation for 30 minutes and check whether the compound meter indicates -0.1Mpa. If

the meter does not indicate -0.1Mpa after pumping 30 minutes, it should be pumped 20 minutes more. If the pressure can't achieve -0.1Mpa after pumping 50 minutes, please check if there are some leakage points.

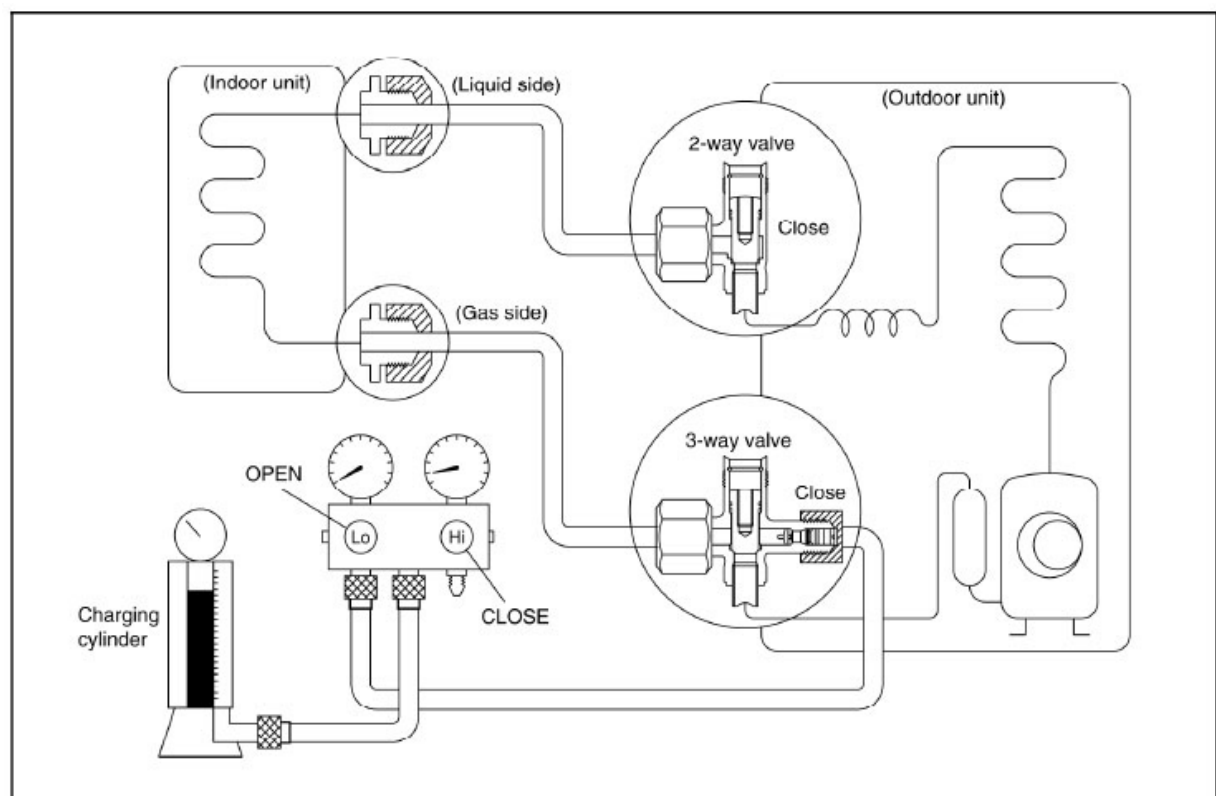
Fully close the handle Lo valve of the manifold valve and stop the operation of the vacuum pump. Confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).

- 7) Turn the flare nut of the 3-way valves about 45° counterclockwise for 6 or 7seconds after the gas

coming out, then tighten the flare nut again. Make sure the pressure display in the pressure indicator is a little higher than the atmosphere pressure. Then remove the charge hose from the 3 way valve.

- 8) Fully open the 2 way valve and 3 way valve and securely tighten the cap of the 3 way valve.

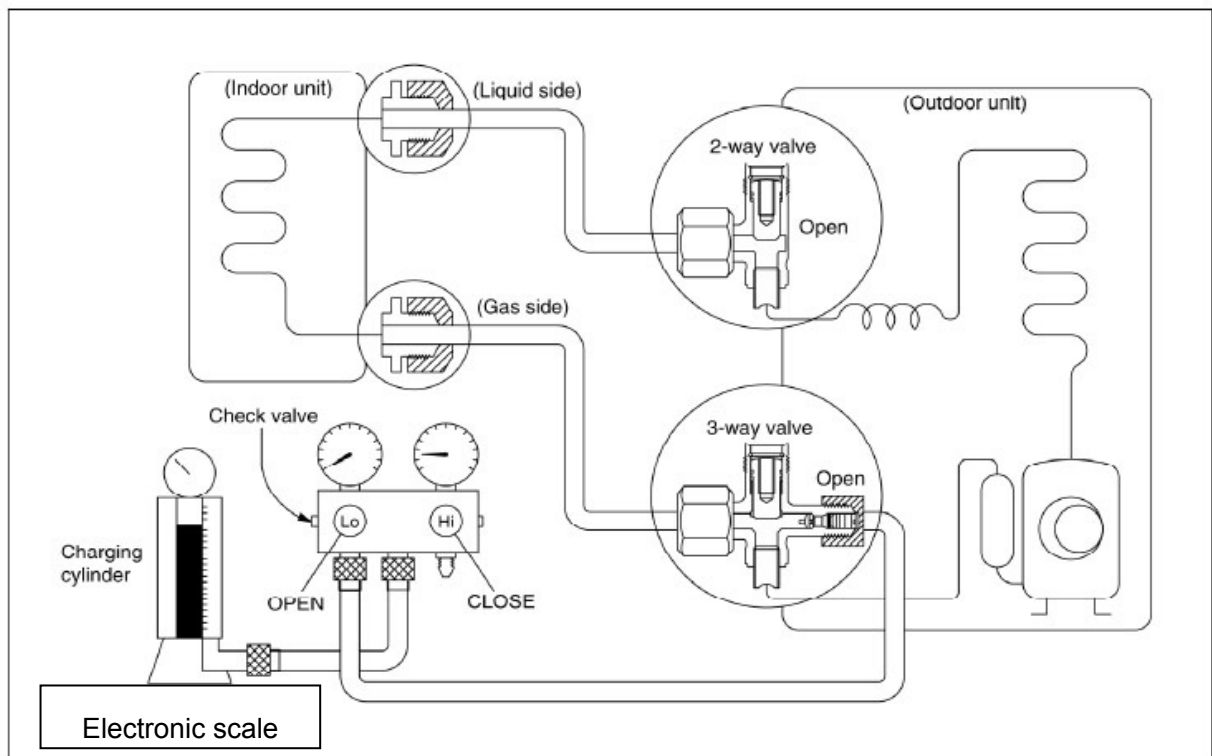
## 2. Air purging by refrigerant



## Procedure:

- 1). Confirm that both the 2-way and 3-way valves are set to the closed position.
- 2). Connect the charge set and a charging cylinder to the service port of the 3-way valve.
- 3). Air purging.  
Open the valves on the charging cylinder and the charge set. Purge the air by loosening the flare nut on the 2-way valve approximately 45° for 3 seconds then closing it for 1 minute; repeat 3 times.  
After purging the air, use a torque wrench to tighten the flare nut on the 2-way valve.
- 4). Check the gas leakage.  
Check the flare connections for gas leakage.
- 5). Discharge the refrigerant.  
Close the valve on the charging cylinder and discharge the refrigerant by loosening the flare nut on the 2-way valve approximately 45° until the gauge indicates 0.3 to 0.5 Mpa.
- 6). Disconnect the charge set and the charging cylinder, and set the 2-way and 3-way valves to the open position.  
Be sure to use a hexagonal wrench to operate the valve stems.
- 7). Mount the valve stems nuts and the service port cap.  
Be sure to use a torque wrench to tighten the service port cap to a torque 18N·m.  
Be sure to check the gas leakage.

## 3. Adding the refrigerant if the pipe length >5m



## Procedure:

- 1). Connect the charge hose to the charging cylinder, open the 2-way valve and the 3-way valve.

Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder. If the refrigerant is R410A, make the cylinder bottom up to ensure the liquid charge.

- 2). Purge the air from the charge hose.

Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).

- 3) Put the charging cylinder onto the electronic scale and record the weight.

- 4) Operate the air conditioner at the cooling mode.

- 5) Open the valves (Low side) on the charge set and charge the system with liquid refrigerant.

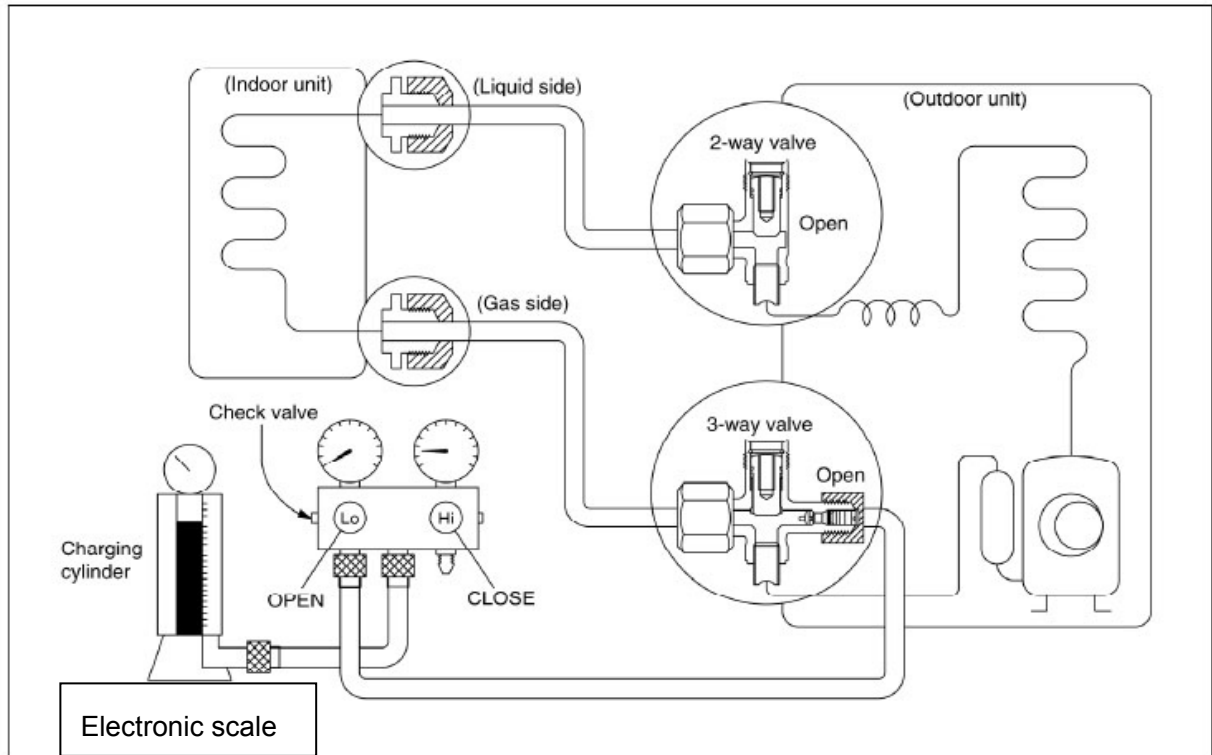
- 6).When the electronic scale displays the proper weight (refer to the table), disconnect the charge hose from the 3-way valve's service port immediately and turn off the air conditioner before disconnecting the hose.

- 7). Mount the valve stem caps and the service port

Use torque wrench to tighten the service port cap to a torque of 18N.m.

Be sure to check for gas leakage.

#### 5.3.4 Adding the refrigerant after running the system for many years



**Procedure:**

- 1). Connect the charge hose to the 3-way service port, open the 2-way valve and the 3-way valve.

Connect the charge hose to the valve at the bottom of the cylinder. If the refrigerant is R410A, make the cylinder bottom up to ensure liquid charge.

- 2). Purge the air from the charge hose.

Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).

- 3) Put the charging cylinder onto the electronic scale and record the weight.

- 4) Operate the air conditioner at the cooling mode.

5) Open the valves (Low side) on the charge set and charge the system with liquid refrigerant.

6).When the electronic scale displays the proper weight (refer to the gauge and the pressure of the low side), disconnect the charge hose from the 3-way valve's service port immediately and turn off the air conditioner before disconnecting the hose.

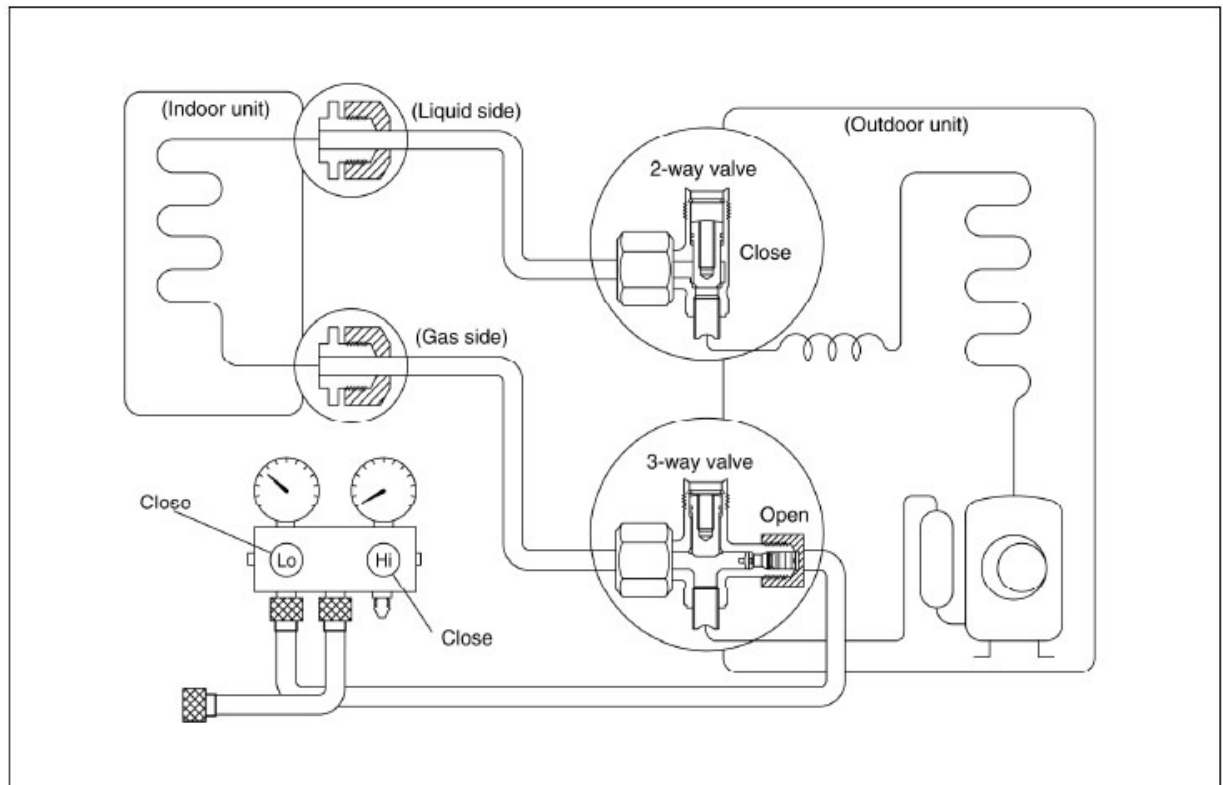
- 7). Mount the valve stem caps and the service port

Use torque wrench to tighten the service port cap to a torque of 18N.m.

Be sure to check for gas leakage.

### 5.3.5 Re-installation while the indoor unit need to be repaired

#### 1. Collecting the refrigerant into the outdoor unit

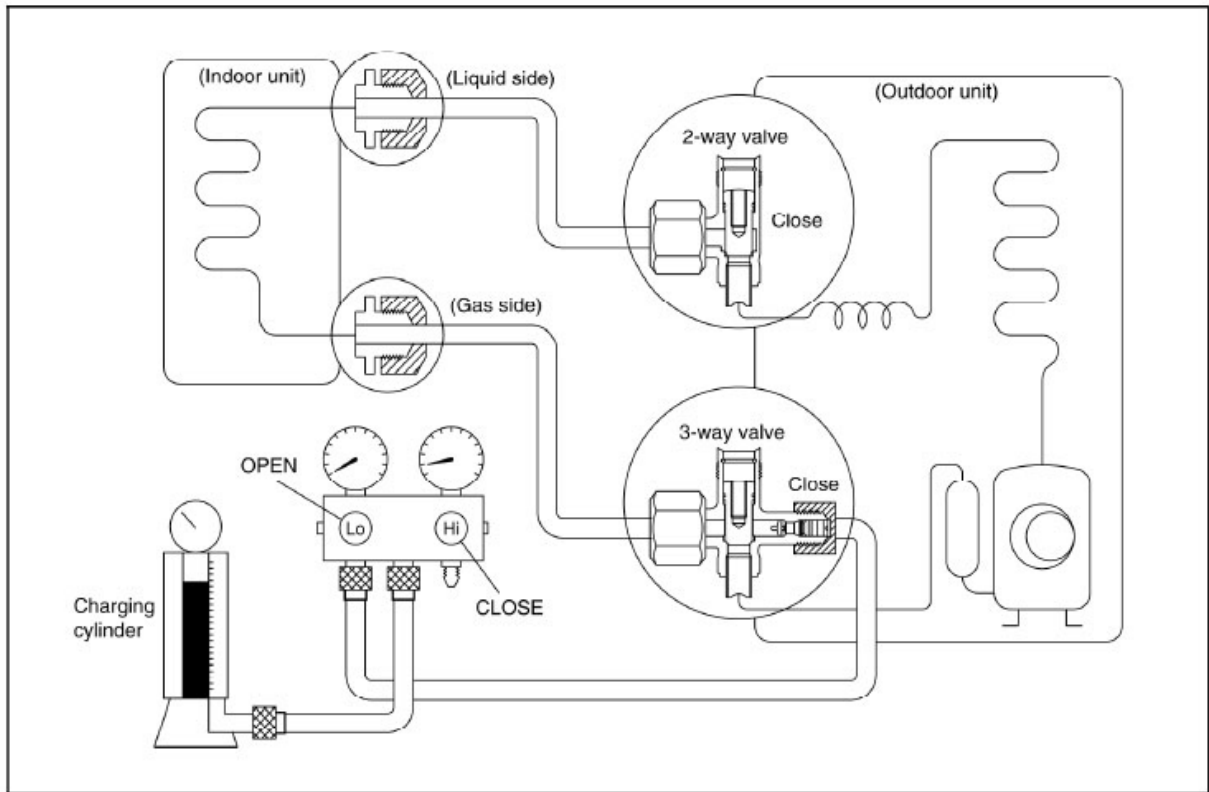


#### Procedure

- 1). Confirm that both the 2-way and 3-way valves are set to the opened position  
Remove the valve stem caps and confirm that the valve stems are in the opened position.  
Be sure to use a hexagonal wrench to operate the valve stems.
- 2). Connect the charge hose with the push pin of handle lo to the 3-way valves gas service port.
- 3). Air purging of the charge hose.  
Open the handle Lo valve of the manifold valve slightly to purge air from the charge hose for 5 seconds and then close it quickly.
- 4). Set the 2-way valve to the close position.
- 5). Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0.1MPa.
- 6). Set the 3-way valve to the closed position immediately  
Do this quickly so that the gauge ends up indicating 0.3 to 0.5Mpa.  
Disconnect the charge set, and tighten the 2-way and 3-way valve's stem nuts.  
Use a torque wrench to tighten the 3-way valves service port cap to a torque of 18N.m.

Be sure to check for gas leakage.

## 2. Air purging by the refrigerant



### Procedure:

- 1). Confirm that both the 2-way and 3-way valves are set to the closed position.
- 2). Connect the charge set and a charging cylinder to the service port of the 3-way valve  
Leave the valve on the charging cylinder closed.
- 3). Air purging.  
Open the valves on the charging cylinder and the charge set. Purge the air by loosening the flare nut on the 2-way valve approximately 45' for 3 seconds then closing it for 1 minute; repeat 3 times.  
After purging the air, use a torque wrench to tighten the flare nut on the 2-way valve.
- 4). Check the gas leakage  
Check the flare connections for gas leakage.
- 5). Discharge the refrigerant.  
Close the valve on the charging cylinder and discharge the refrigerant by loosening the flare nut on the 2-way valve approximately 45' until the gauge indicates 0.3 to 0.5 Mpa.
- 6). Disconnect the charge set and the charging cylinder, and set the 2-way and 3-way valves to the open position  
Be sure to use a hexagonal wrench to operate the valve stems.
- 7). Mount the valve stems nuts and the service port cap

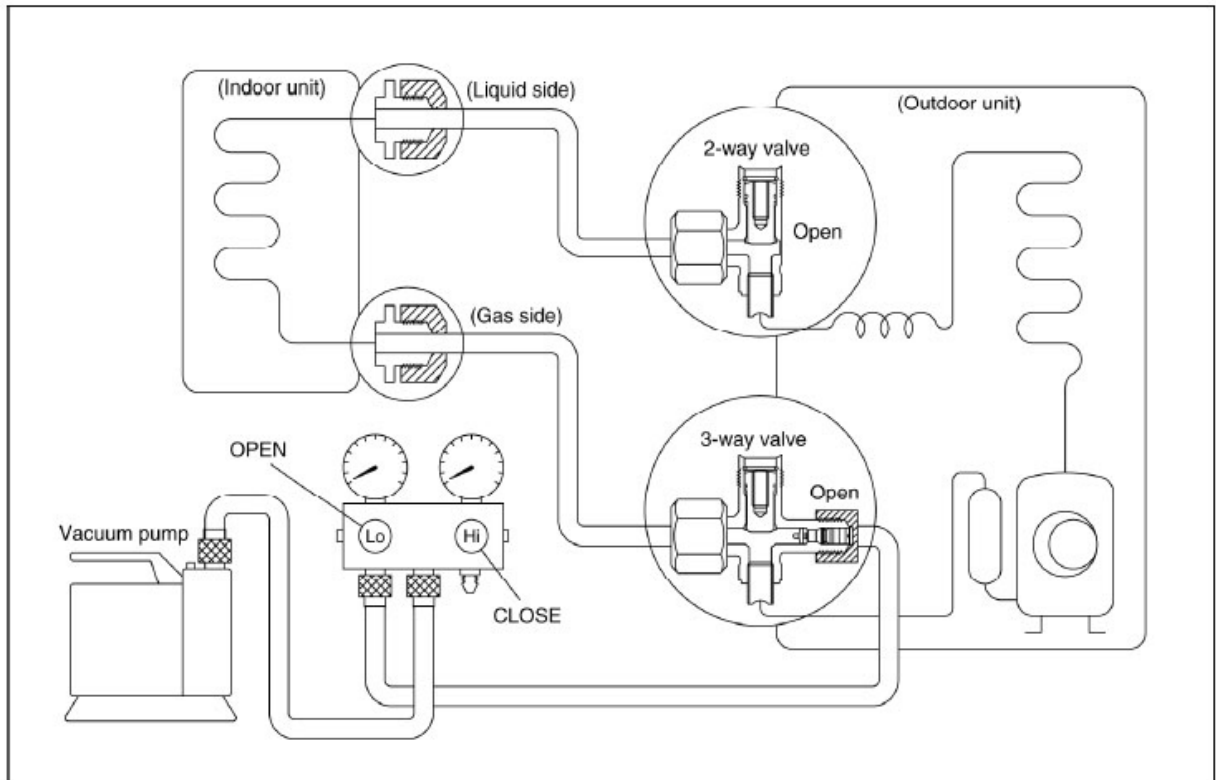


Be sure to use a torque wrench to tighten the service port cap to a torque 18N.m.

Be sure to check the gas leakage.

### 5.3.6 Re-installation while the outdoor unit need to be repaired

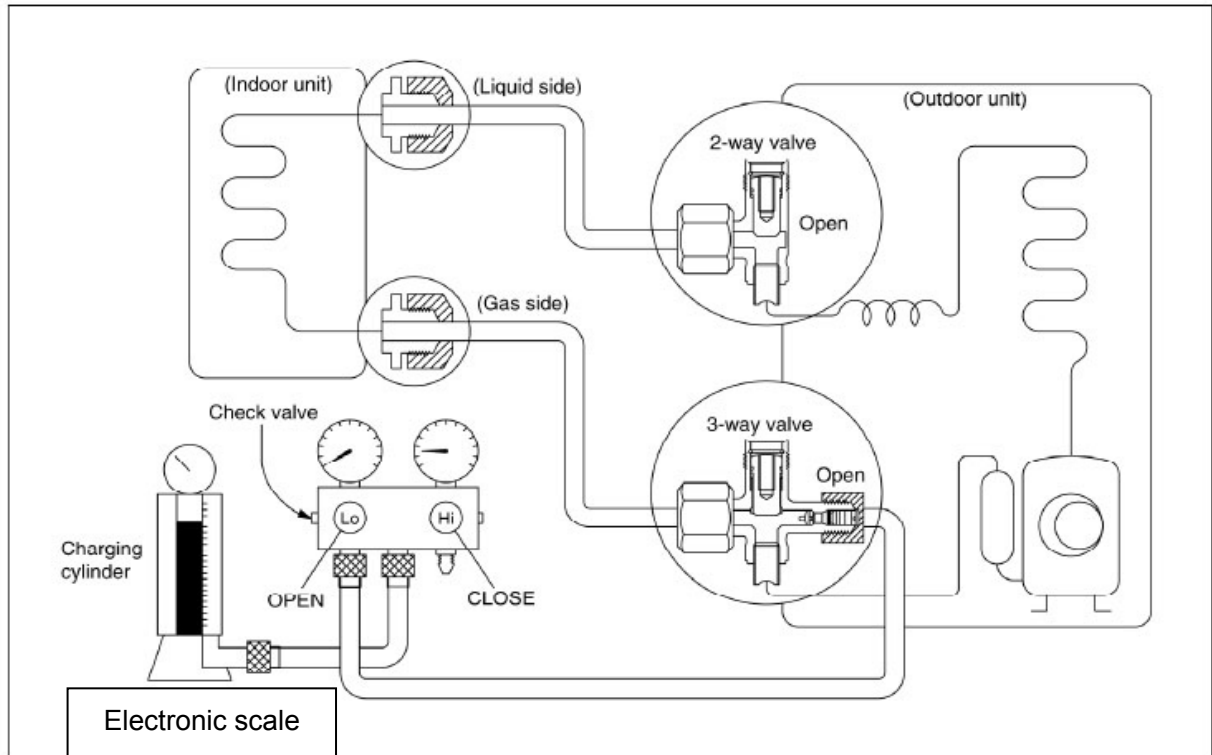
#### 1. Evacuation for the whole system



#### Procedure:

- 1). Confirm that both the 2-way and 3-way valves are set to the opened position.
- 2). Connect the vacuum pump to 3-way valve's service port.
- 3). Evacuation for approximately one hour. Confirm that the compound meter indicates  $-0.1\text{Mpa}$ .
- 4). Close the valve (Low side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).
- 5). Disconnect the charge hose from the vacuum pump.

#### 2. Refrigerant charging



**Procedure:**

- 1). Connect the charge hose to the charging cylinder, open the 2-way valve and the 3-way valve

Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder. If the refrigerant is R410A, make the cylinder bottom up to ensure liquid charge.

- 2). Purge the air from the charge hose

Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).

- 3) Put the charging cylinder onto the electronic scale and record the weight.

- 4). Open the valves (Low side) on the charge set and charge the system with liquid refrigerant

If the system cannot be charge with the specified amount of refrigerant, or can be charged with a little at a time (approximately 150g each time) , operating the air conditioner in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure.

- 5).When the electronic scale displays the proper weight, disconnect the charge hose from the 3-way valve's service port immediately

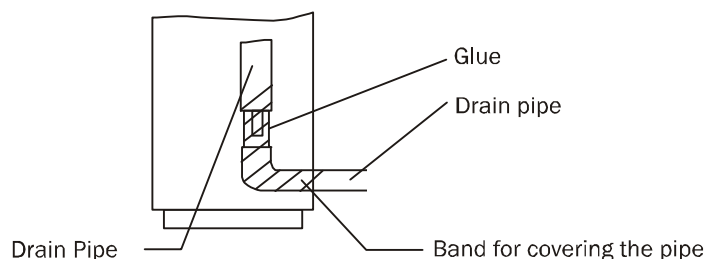
If the system has been charged with liquid refrigerant while operating the air conditioner, turn off the air conditioner before disconnecting the hose.

6). Mounted the valve stem caps and the service port

Use torque wrench to tighten the service port cap to a torque of 18N.m.

Be sure to check for gas leakage

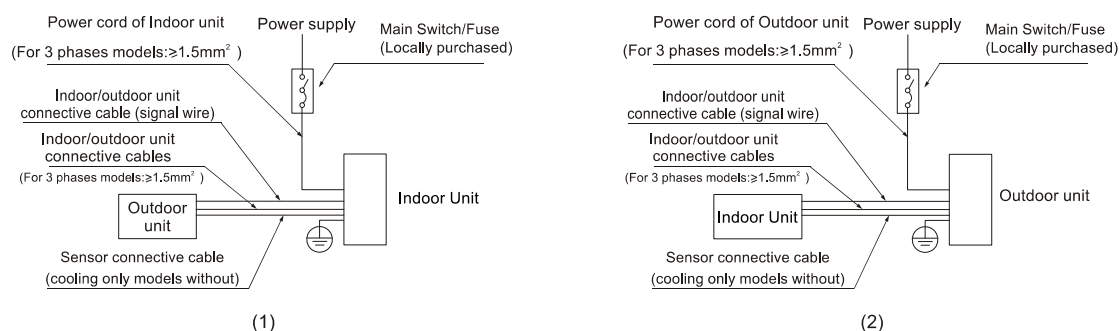
## 5.4 Drain Pipe of The Indoor Unit



1. Make sure the drain pipe is connected to the outdoor side downward;
2. The hard polyvinyl chloride(PVC)plastic pipe (external diameter 26 mm) sold is the market is suitable for the attached soft drain pipe;
3. Please connect the Soft Drain Pipe with the Drain Pipe, then fix it with band;
4. If you have to connect the Drain Pipe indoors, to avoid condensing caused by air intake, you must cover the pipe with heat-insulation material (polyethylene with Specific Gravity of 0.03, at least 9 mm in thickness), and use Glue Band to fix it.
5. After the Drain Pipe has been connected, please check if the water drains out of the pipe efficiently and has no leakage.
6. Refrigerant pipe and Drainpipe should be heat-insulated to avoid condensing and water-dropping later on.

## 5.5 Wiring

Please refer to the Wiring Diagram.



Note: The power supply of the air conditioner is different according to the models. Please refer to the WIRING DIAGRAM pasted on the indoor and outdoor units before wire connection.

Model	Power supply	Input Rated Amp (Switch/Fuse)	Power Cord Size
<24000Btu/h	220-240V~ 50Hz	32/25A	≥2.5mm <sup>2</sup>
≥24000Btu/h	220-240V~ 50Hz	63/50A	≥6mm <sup>2</sup>
≥24000Btu/h	380-420V~ 50Hz	16/16A	≥1.5mm <sup>2</sup>

## 5.6 Test run

Perform test operation after completing gas leak and electrical safety check. The test operation time should last more than 30 minutes.

1. Open the panel and lift the panel up to angle which remains fixed. Do not lift the panel any further when it stops with a "click" sound.
2. Press the manual switch button twice until the operation indicator lights, the unit will operate on manual cool mode.
3. Check if all the functions works well while testing the air conditioner. Especially check whether the drainage of indoor unit is smooth or not.
4. Press the manual switch button again till the operation indicator turns dark after finishing the test operation and the unit stops operation.

## 6. External view and display

### 6.1 External view

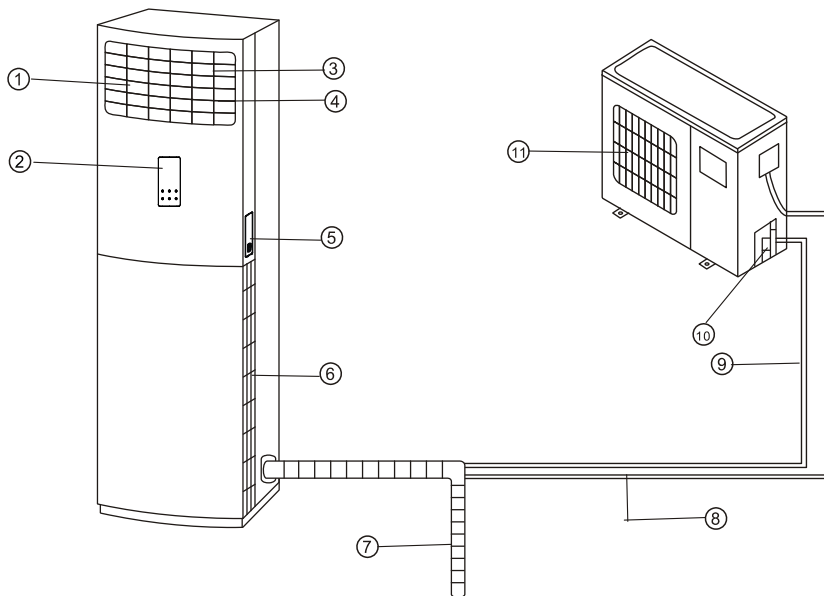
This unit consists of indoor unit and outdoor unit.

#### Indoor unit

- ① Air outlet
- ② Operation panel
- ③ Horizontal airflow control louver
- ④ Vertical airflow control louver
- ⑤ Remote controller holder (on some models)
- ⑥ Air inlet (2 sides)

#### Outdoor unit

- ⑦ Drain pipe, vent pipe
- ⑧ Connection cable
- ⑨ Connection pipe
- ⑩ Refrigerant pipe port
- ⑪ Air outlet



#### Note:

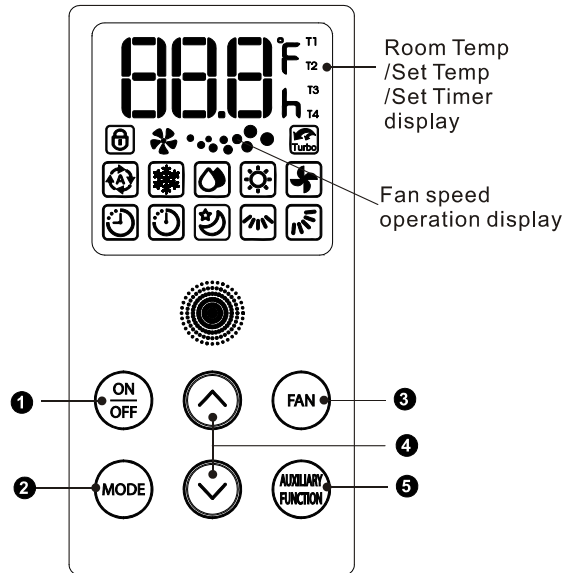
All the pictures in this manual are for explanation purpose only.

They may be slightly different from the air conditioner you purchased (depend on model).

The actual shape shall prevail.

## 6.2 Control Panel

### Control Buttons and Functions



### Indicators

- Auto operation display
- Cooling operation display
- Dry operation display
- Heating operation display
- Fan operation display
- Vertical airflow display(optional)
- Horizontal airflow display
- Sleep operation display
- Turbo operation display(optional)
- Off timer operation display
- On timer operation display
- Lock operation display

## 7.Operation characteristics

<b>Mode Temperature</b>	<b>Cooling operation</b>	<b>Heating operation</b>	<b>Drying operation</b>
<b>Room temperature</b>	17°C~32°C	0°C~30°C	17°C~32°C
<b>Outdoor temperature</b>	18°C~43°C	-7°C~24°C	18°C~ 43°C

### CAUTION:

1. If air conditioner is used outside of the above conditions, certain safety protection features may come into operation and cause the unit to function abnormally.

2. Room relative humidity less than 80%. If the air conditioner operates in excess of this figure, the surface of the air conditioner may attract condensation. Please sets the vertical air flow louver to its maximum angle (vertically to the floor), and set HIGH fan mode.

3. Optimum performance will be achieved within this operating temperature.

## 8. Electronic function

### 8.1 Main data Introduction

Ts : Set temperature,

T1 : Room temperature

T2: Evaporator pipe temperature

T3: Condenser pipe temperature

T4: Outdoor ambient temperature

T5: Compressor discharge temperature

### 8.2 Main Protection

#### 8.2.1 Time delay for the compressor start-up

At the beginning of energizing or after the stop of the compressor, certain time delay will be needed to start the compressor.

When switching over between cooling/heating/dehumidifying mode, the compressor stops automatically.

#### 8.2.2 Sensor protection at open circuit and breaking disconnection.

#### 8.2.3 Phase check function

If the phase sequence is detected wrong or lack of 1 or 2 phase, the unit won't start and there is error code displayed on outdoor PCB.

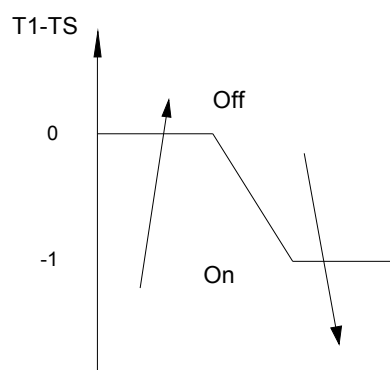
### 8.3 Operation Modes and Functions

#### 8.3.1 Heating Mode

8.3.1.1 Four-way valve opens at once, while defrosting process closes.

8.3.1.2 Compressor and outdoor fan running rules:

Once the compressor starts up, it will follow the below rules:



When compressor is on, outdoor fan will follow the below rules::

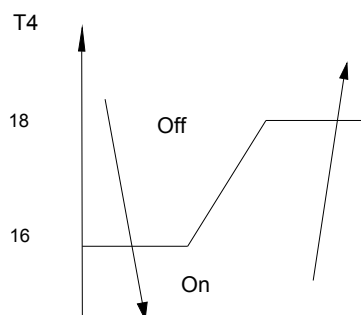
For single-fan models: The outdoor fan runs all the time.

For double-fan models:

Fan(below): When compressor is on, the outdoor fan runs all the time.



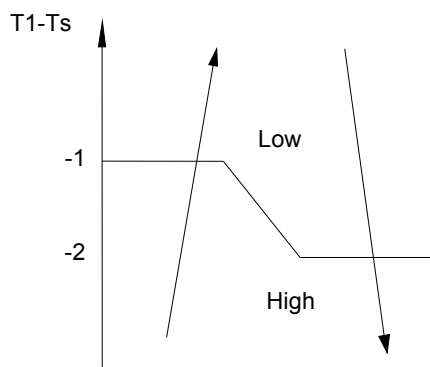
Fan(above):



8.3.1.3 Indoor fan running rules:

When the compressor is on, the indoor fan can be set to high/low/auto. And the anti-cold wind function has the priority.

**Auto fan action:**



8.3.1.4 Defrost (only available to heating mode)

---Defrosting Conditions

Starting Of Defrosting Condition (meet one of the following is ok):

(1) Accumulated time when temperature of outdoor heat exchanger coil T3 is below 3°C reaches to 40 minutes, then consecutive 3 minutes less than -5 degrees (Just for the AC is turn on , whether or not the heating mode the temperature was detected, start to statistical time when reach the temperature condition . Shut down or defrosting calculate time again).

(2) Accumulated time when temperature of outdoor heat exchanger coil T3 is below 3°C reaches to 60 minutes, then consecutive 3 minutes less than -4 degrees (Just for the AC is turn on , whether or not the heating mode the temperature was detected, start to statistical time when reach the temperature condition . Shut down or defrosting calculate time again).

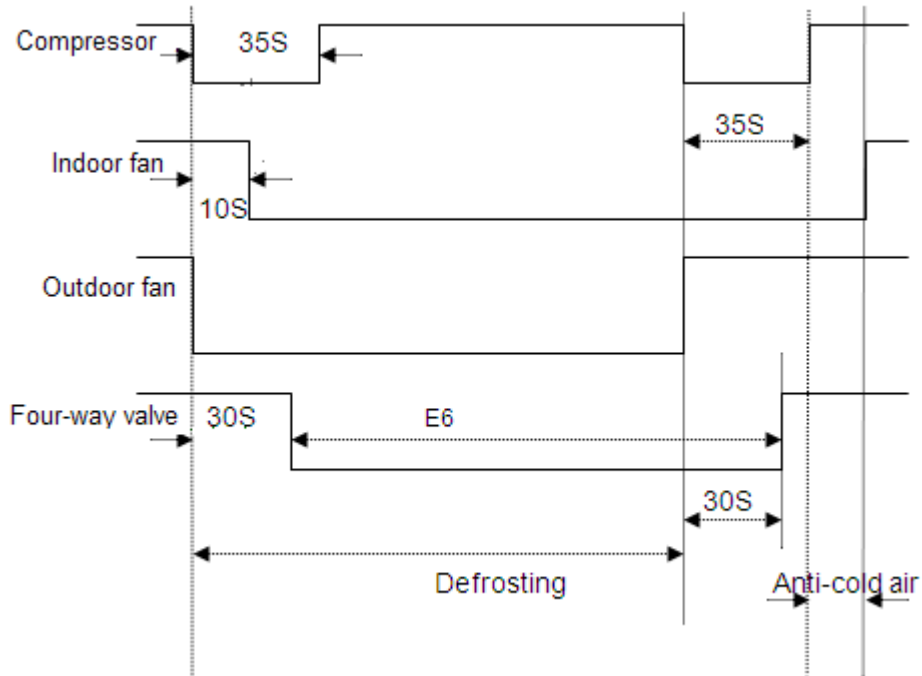
(3) Accumulated time when temperature of outdoor heat exchanger coil T3 is below 3°C reaches to 80 minutes, then consecutive 3 minutes less than -2 degrees (Just for the AC is turn on , whether or not the heating mode the temperature was detected, start to statistical time when reach the temperature condition . Shut down or defrosting calculate time again).

(4) Under evaporator high temperature protection, the accumulated time when outdoor

fan motor is off and compressor is on reaches up to over 90 minutes .( Shut down or defrosting or T3 is over 15°C, calculate time again.)

--- Defrosting Action

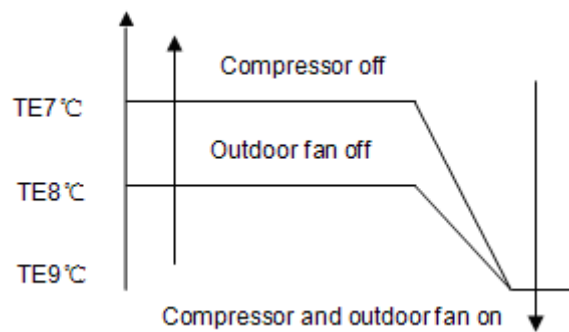
Four-way valve, indoor fan, outdoor fan are shut down. Compressor keeps on.



--- Ending Of Defrosting Condition (meet one of the following is ok):

- (1) Time of defrosting lasts 10 minutes.
- (2) Temperature of outdoor coil T3 is up to 8°C and continues to 80 seconds.
- (3) Temperature of outdoor coil T3 is up to 15°C.

### 8.3.1.5 High evaporator coil temp. T2 protection:



TE7	TE8	TE9
62°C	56°C	50°C

### 8.3.2 Cooling Mode

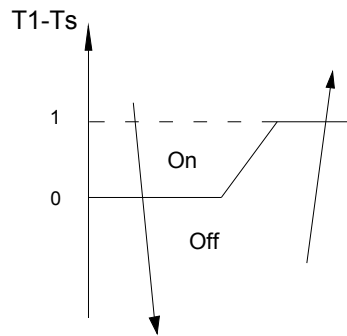
8.3.2.1 Four-way valve is closed.

If four-way valve is open before the machine enters cooling mode, then four-way valve will

be closed at the first time, the compressor starts under the cooling mode.

### 8.3.2.2 Compressor and outdoor fan running rules

Once the compressor starts up, it will follow the below rules:



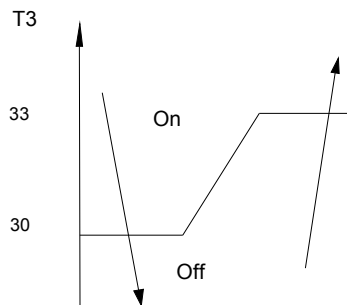
When compressor is on, outdoor fan will follow the below rules::

For single-fan models: The outdoor fan runs all the time.

For double-fan models:

Fan(below): When compressor is on, the outdoor fan runs all the time.

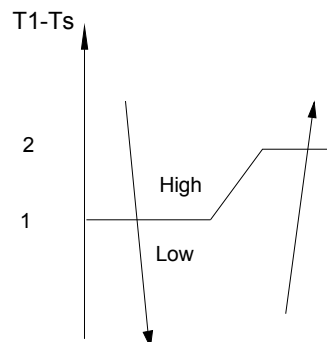
Fan(above):



### 8.3.2.3 Indoor fan running rules

In cooling mode, indoor fan runs all the time and the speed can be selected as high, low and auto.

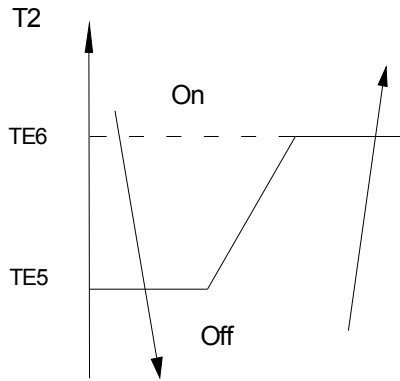
The auto fan:



### 8.3.2.4 Low evaporator coil temperature $T2$ protection

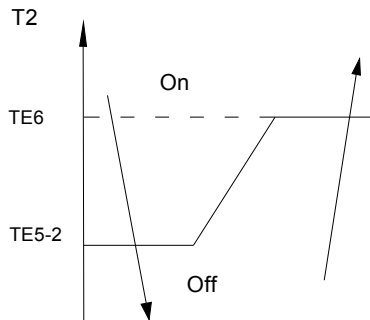
AC will enter  $T2$  protection if any of the following conditions is satisfied.

Condition 1:



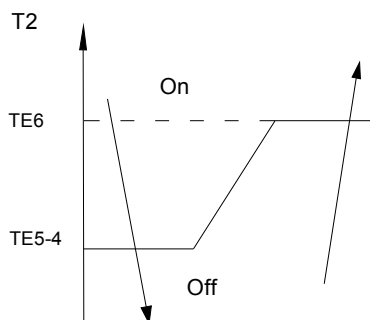
When the evaporator coil temp.T2 keeps lower than TE5 for 30 minutes, the compressor and outdoor fan will shut off. When T2 is higher than TE6, the compressor and outdoor fan will restart up.

Condition 2:



When the evaporator coil temp.T2 keeps lower than TE5-2 for 20 minutes, the compressor and outdoor fan will shut off. When T2 is higher than TE6, the compressor and outdoor fan will restart up.

Condition 3:



When the evaporator coil temp.T2 keeps lower than TE5-4 for 8 minutes, the compressor and outdoor fan will shut off. When T2 is higher than TE6, the compressor and outdoor fan will restart up.

TE5	TE6
4°C	7°C

### 8.3.2.5 Condenser high temperature T3 protection

When  $T3 \geq T3\_Pro^{\circ}C$  for 3 seconds, the compressor will shut off. When  $T3 < 48^{\circ}C$ , the compressor will restart.

### 8.3.3 Dehumidifying Mode

8.3.3.1 Indoor fan speed is low.

8.3.3.2 Four-way valve is closed, the compressor and outdoor fan will operate the same as in cooling mode.

### 8.3.4 Auto Mode

8.3.4.1. Under auto mode, the indoor fan is set to be auto and the temperature is  $24^{\circ}C$ .

8.3.4.2 When entering auto mode, the heating, fan only or cooling operation will be automatically chosen according to the room temperature  $T1$  and the set temperature  $Ts$ .

Condition	Mode
$T1 - Ts > 1^{\circ}C$	Cooling
$-1^{\circ}C \leq T1 - Ts \leq 1^{\circ}C$	Fan
$T1 - Ts < -1^{\circ}C$	Heating(fan for cooling only type)

8.3.4.3. If certain condition is met, then the corresponding protective function will be executed.

### 8.3.5 Fan Only Mode

8.3.5.1 Temperature setting function is disabled, and no setting temperature is displayed.

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

8.3.5.3 High/Low/Auto fan can be switched over through manual control. Auto fan will be controlled in line with cooling auto fan with temperature set to be  $24^{\circ}C$ .

## 8.4 Other Functions

### 8.4.1 LCD display

Mode, Set temp, fan speed, time, timer, protection etc.

### 8.4.2 Timer function

8.4.2.1 Timing range is 24 hours.

8.4.2.2 Timer on. The machine will turn on automatically when reaching the setting time.

8.4.2.3 Timer off. The machine will turn off automatically when reaching the setting time.

8.4.2.4 Timer on/off. The machine will turn on automatically when reaching the setting "on" time, and then turn off automatically when reaching the setting "off" time.

8.4.2.5 Timer off/on. The machine will turn off automatically when reaching the setting "off" time, and then turn on automatically when reaching the setting "on" time.

8.4.2.6 The timer function will not change the AC current operation mode. Suppose AC is off now, it will not start up firstly after setting the "timer off" function. And when reaching the setting time, the timer LED will be off and the AC running mode has not been changed.

8.4.2.7 The setting time is relative time.

### 8.4.3 Economy function

8.4.3.1 It is valid in cooling, heating and auto mode.

8.4.3.2. Turning off, changing mode or setting fan speed will cancel economy function.

8.4.3.3 Operation process in sleep mode is as follow:

After pressing ECONOMIC or SLEEP button on the controller, the machine will go into economy mode.

When cooling, the setting temperature rises 1°C (be lower than 30°C) every hour, 2 hours later the setting temperature stops rising.

For heat pump models, when they are in heating, the setting temperature reduces 1°C (be higher than 17°C) every hour, 2 hours later the setting temperature stops reducing.

8.4.3.4 In this mode, the fan speed is forced into AUTO mode.

#### **8.4.4 Refrigerant leakage detection**

This function is only active in cooling mode and **dehumidifying mode**. It can better prevent the compressor being damaged by refrigerant leakage or compressor overload.

Open condition:

Define the evaporator coil temp. T2 of the compressor just starts running as Tcool.

In the beginning 5 minutes after the compressor starts up, if  $T2 < T_{cool} - 2^{\circ}\text{C}$  does not keep continuous 4 seconds and this situation happens 3 times, the display area will show "EC" and AC will turn off.

## 9.Trouble shooting

### 9.1 Self-diagnosis

#### 9.1.1 LEDs for the indication of indoor trouble

##### MDFM-24ARN1

Codes	Contents
P4	Temperature protection of indoor evaporator
P5	Temperature protection of outdoor condenser
P9	Anti-cold air(For heat pump models)
E1	Open- or short-circuit of T1 temperature sensor
E2	Open- or short-circuit of T2 temperature sensor
E3	Open- or short-circuit of T3 temperature sensor
E6	Protection of outdoor unit
EC	Refrigerant leakage detection
HS	Defrosting(For heat pump models)

##### MDFM-48ARN1

##### MDFM-60ARN1

Codes	Contents
P4	Temperature protection of indoor evaporator
P5	Temperature protection of outdoor condenser
P7	Temperature protection of compressor discharge
P9	Anti-cold wind(For heat pump models)
P10	Low pressure protection
P11	High pressure protection
P12	Current overload protection
E1	Open- or short-circuit of T1 temperature sensor
E2	Open- or short-circuit of T2 temperature sensor
E3	Open- or short-circuit of T3 temperature sensor
E4	Open- or short-circuit of T4 temperature sensor
E5	Communication malfunction between indoor unit and outdoor unit
E10	Low pressure failure of compressor
E13	Lack of phase
E14	Default phase of compressor
EC	Refrigerant leakage detection
HS	Defrosting(For heat pump models)

### 9.1.2 LEDs for the indication of outdoor trouble (only for 48K-60K)

LED2(green)	LED3(yellow)	LED4(red)	Contents
On	Off	Off	OK
Off	On	Off	Standby
Off	Off	Flash	Lack of phase
Off	Flash	Off	Phase sequence error
Off	Flash	Flash	Communication malfunction between indoor unit and outdoor unit
Off	Off	On	Open- or short-circuit of T3 temperature sensor
Flash	Off	Off	Open- or short-circuit of T4 temperature sensor
On	Off	On	Temperature protection of compressor discharge
Flash	Flash	Off	High pressure protection
Flash	Off	Flash	Low pressure protection
Off	Flash	On	Overload of current
Flash	Flash	On	High temperature protection of condenser
Flash	Flash	Flash	Fan jump selection error



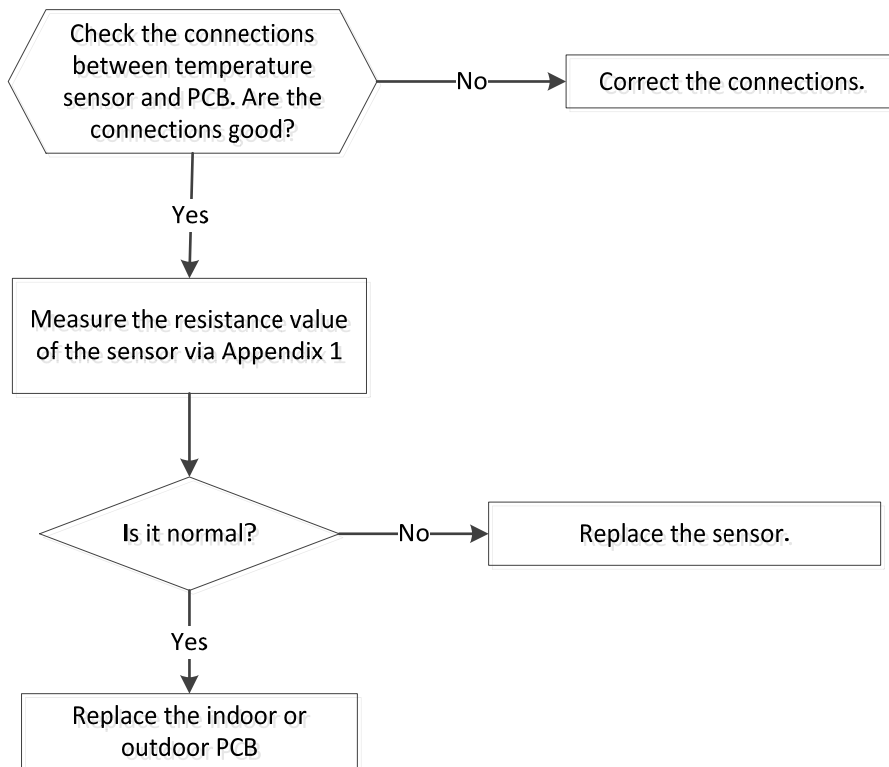
## 9.2 Troubles and Solutions

Before calling for service, please review the following list of common problems and solutions.

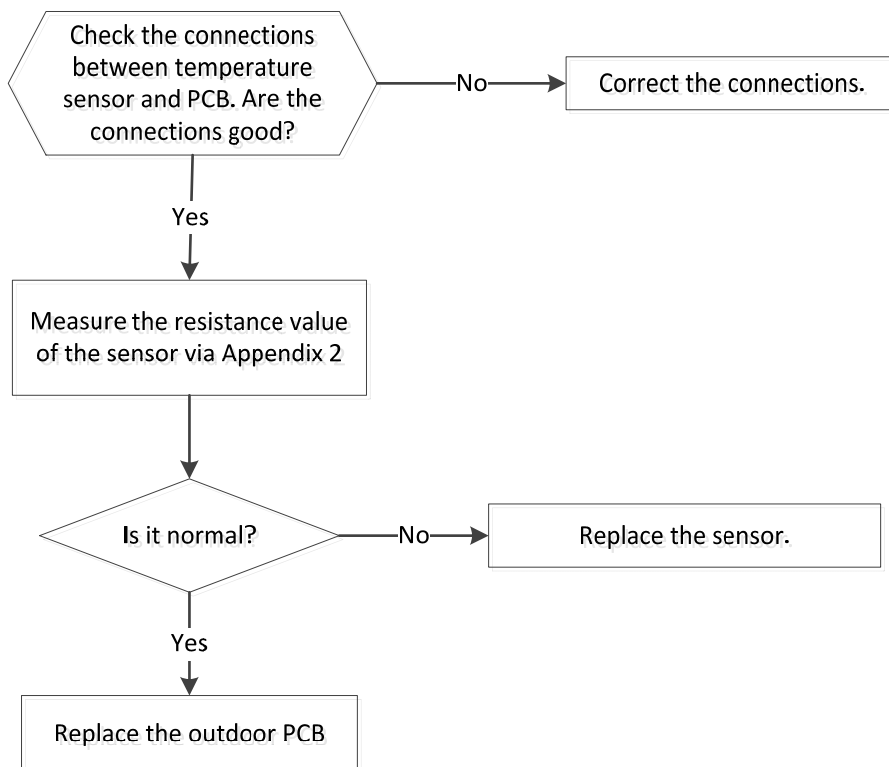
Problem	Possible Cause	Solutions
Air conditioner does not operate at all	Power failure	Wait for power restoring
	The power supply is disconnected.	Switch on the main power switch
	The power fuse is blown.	Change the fuse
	The timer is set.	Wait or cancel timer setting
	The batteries of the remote control are exhausted	Change the batteries.
Air conditioner does not cool or heat well	The temperature setting is too high or too low.	Set a more comfortable temperature.
	The air filter is clogged with dust	Clean the filter
	The air inlet or outlet of the outdoor unit is blocked	Clear up the block
	Doors or windows are open	Close the doors or windows
Air conditioner does not cool or heat at all	The air inlet or outlet of the outdoor unit is blocked	Clear up the block first, then begin to operate.
	Three-minute protection feature	Wait for a while
	Unappropriated temperature setting	Set the temperature properly

If you still cannot solve the problem after trying the above, pull out the power plug and call the dealer.

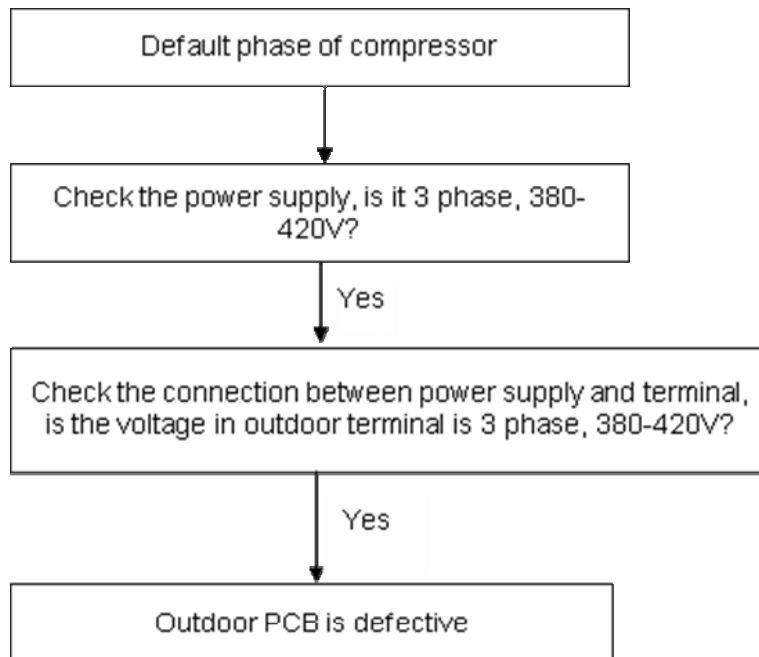
### 9.2.1 Open or short circuit of temperature sensor(T1,T2,T3,T4)



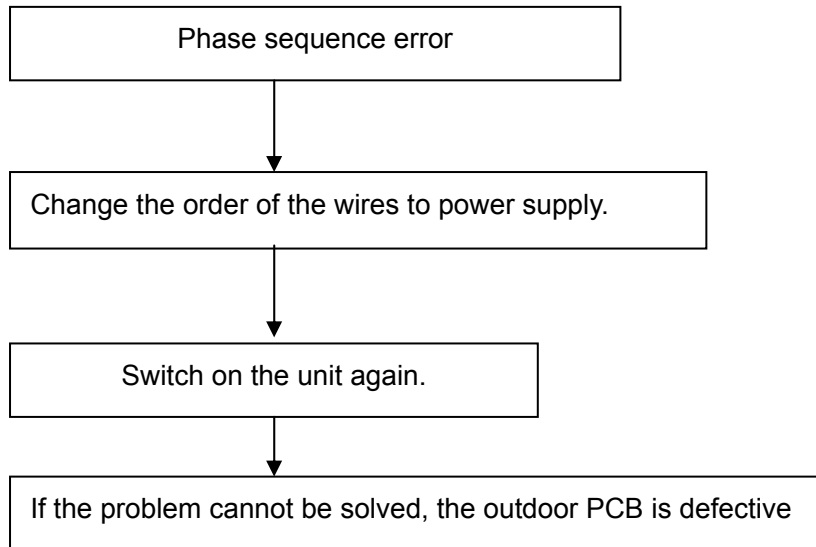
### 9.2.2 Open or short circuit of temperature sensor(T5)



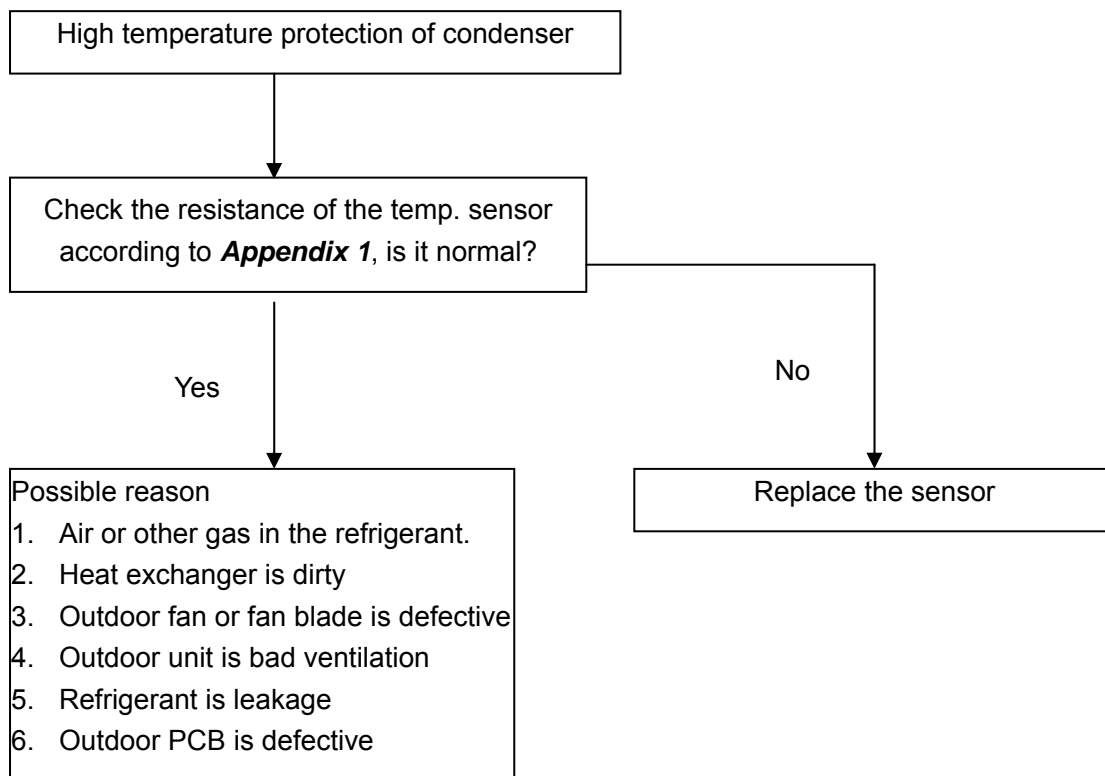
### 9.2.3 Default phase of compressor



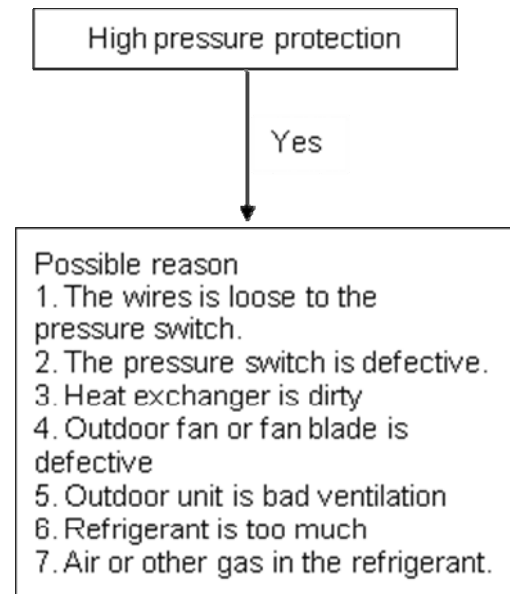
### 9.2.4 Phase sequence error



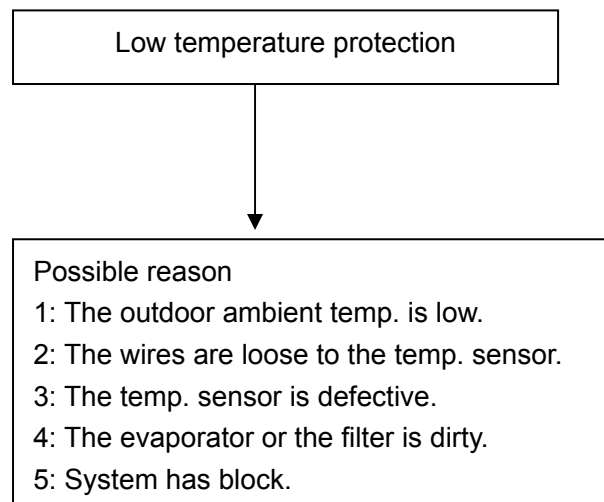
### 9.2.5 High temperature protection of condenser



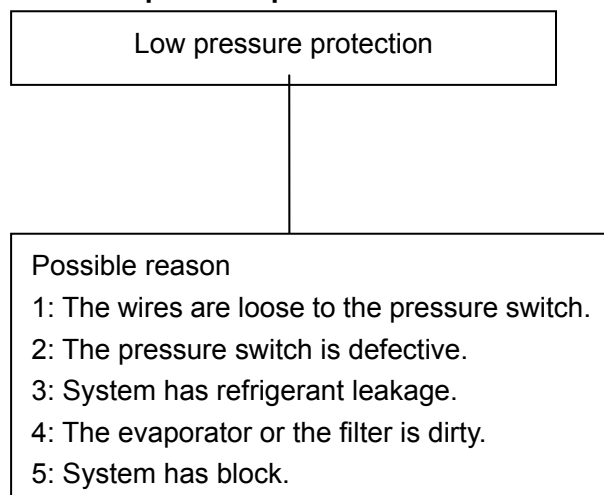
### 9.2.6 High pressure protection



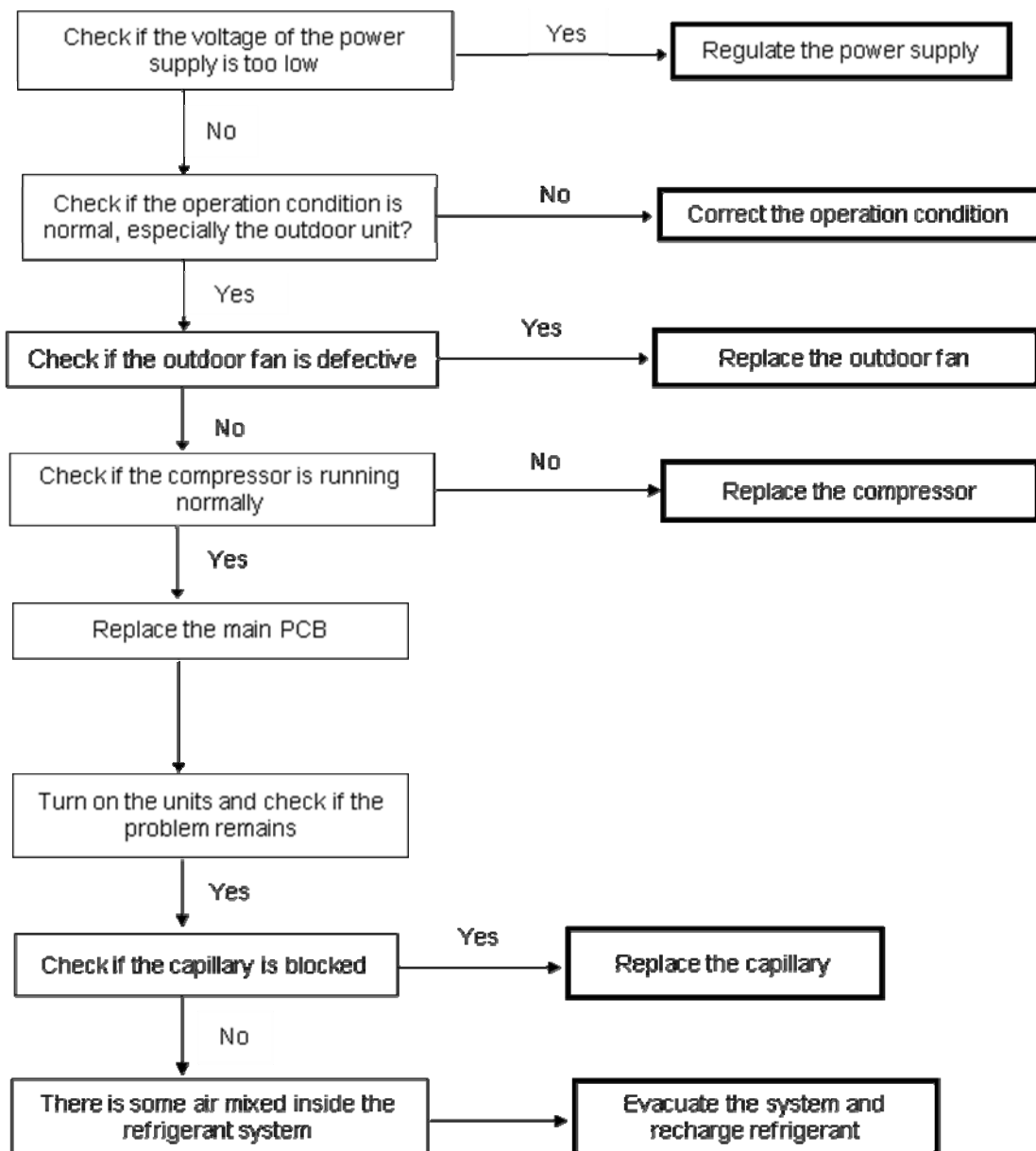
### 9.2.7 Low temperature protection



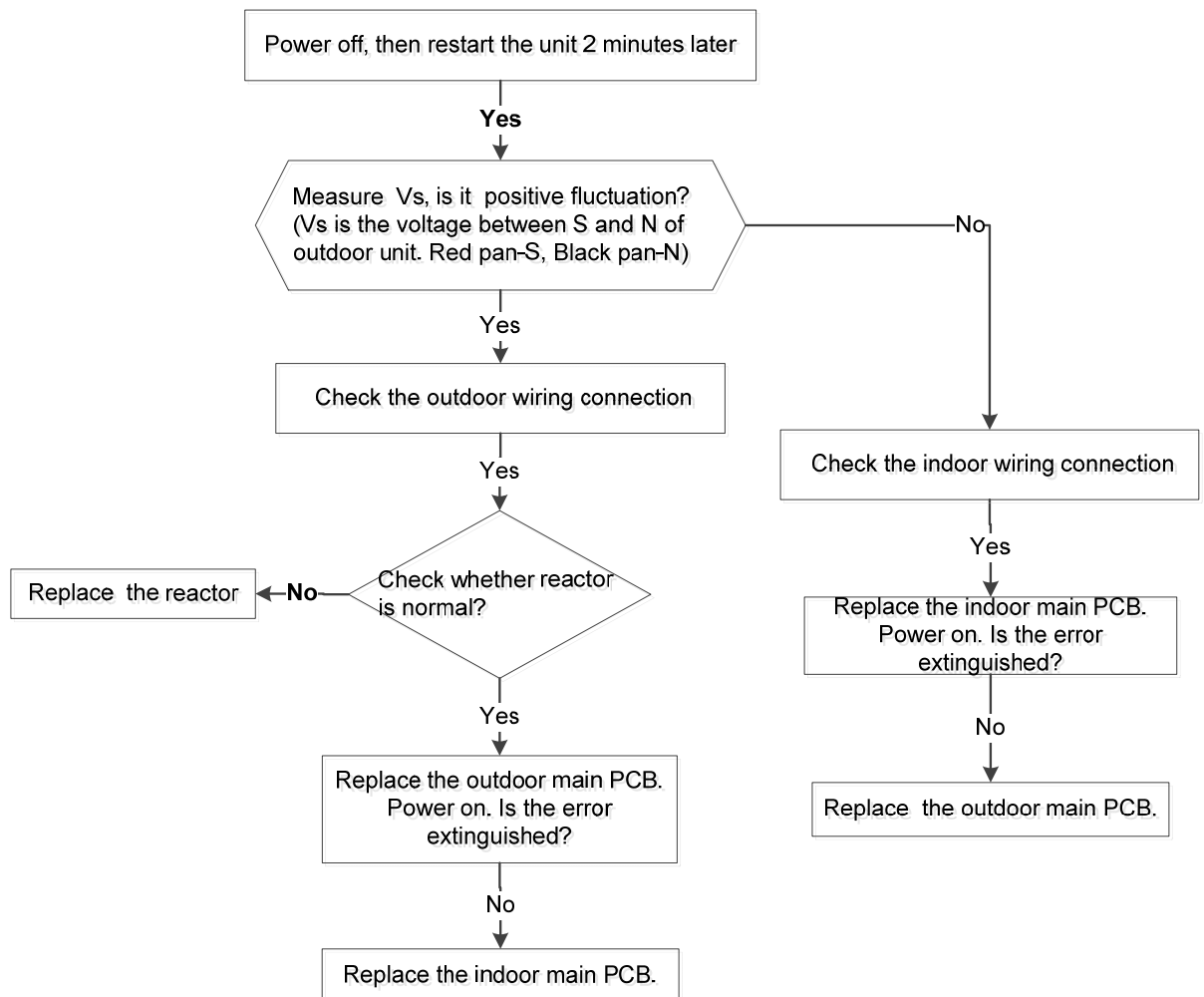
### 9.2.8 Low pressure protection



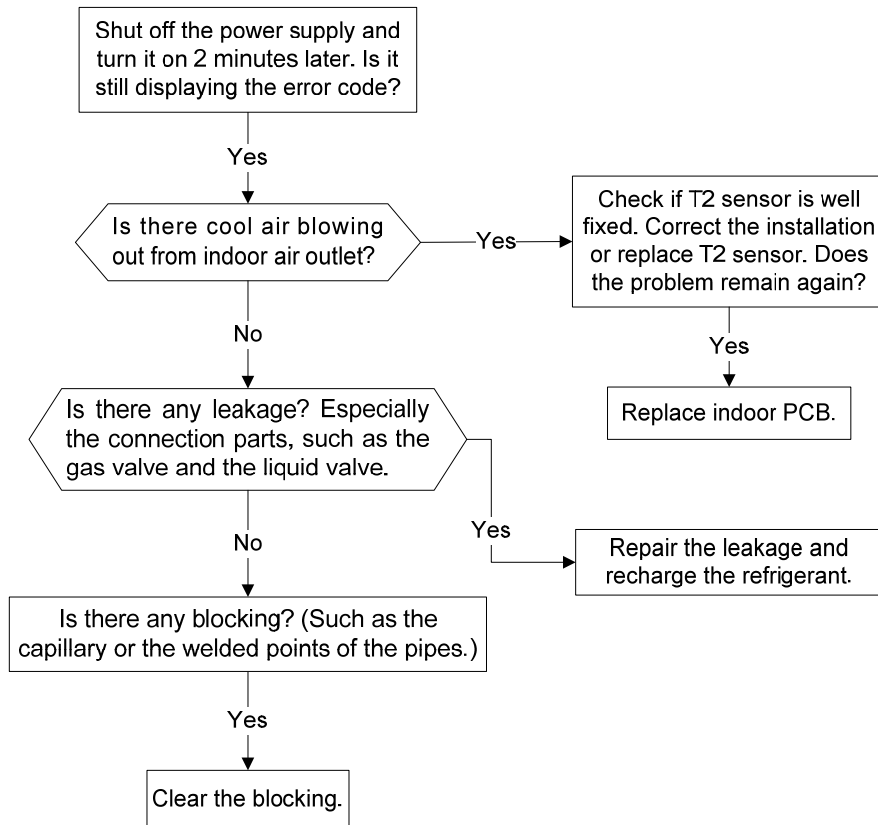
### 9.2.9 Overload of current



### 9.2.10 Communication malfunction between indoor unit and outdoor unit

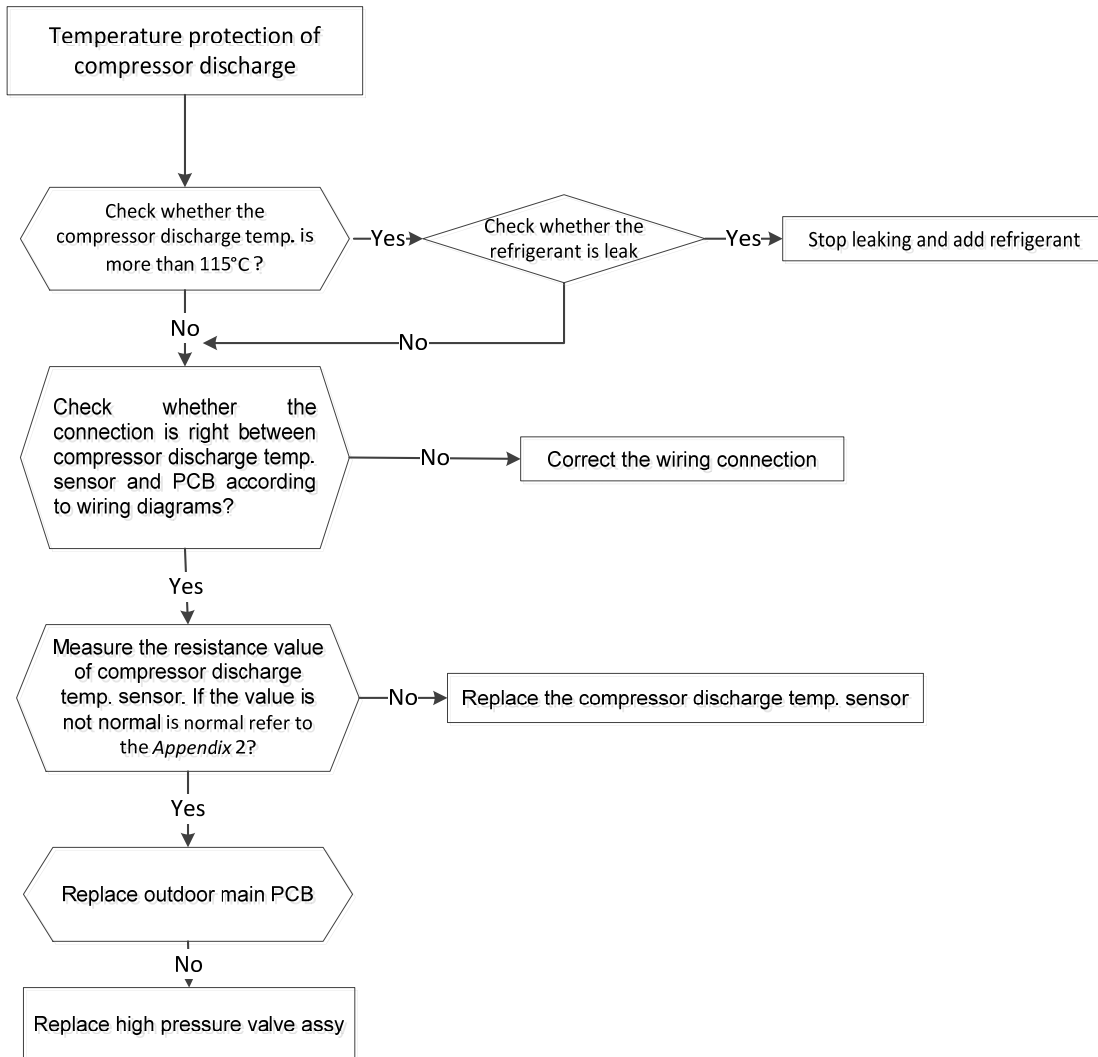


## 9.2.11 Refrigerant Leakage Detection





## 9.2.12 Temperature protection of compressor discharge



**Appendix 1** Temperature Sensor Resistance Value Table (°C--K)

°C	K Ohm	°C	K Ohm	°C	K Ohm	°C	K Ohm
-20	115.266	20	12.6431	60	2.35774	100	0.62973
-19	108.146	21	12.0561	61	2.27249	101	0.61148
-18	101.517	22	11.5000	62	2.19073	102	0.59386
-17	96.3423	23	10.9731	63	2.11241	103	0.57683
-16	89.5865	24	10.4736	64	2.03732	104	0.56038
-15	84.2190	25	10.0000	65	1.96532	105	0.54448
-14	79.3110	26	9.55074	66	1.89627	106	0.52912
-13	74.5360	27	9.12445	67	1.83003	107	0.51426
-12	70.1698	28	8.71983	68	1.76647	108	0.49989
-11	66.0898	29	8.33566	69	1.70547	109	0.48600
-10	62.2756	30	7.97078	70	1.64691	110	0.47256
-9	58.7079	31	7.62411	71	1.59068	111	0.45957
-8	56.3694	32	7.29464	72	1.53668	112	0.44699
-7	52.2438	33	6.98142	73	1.48481	113	0.43482
-6	49.3161	34	6.68355	74	1.43498	114	0.42304
-5	46.5725	35	6.40021	75	1.38703	115	0.41164
-4	44.0000	36	6.13059	76	1.34105	116	0.40060
-3	41.5878	37	5.87359	77	1.29078	117	0.38991
-2	39.8239	38	5.62961	78	1.25423	118	0.37956
-1	37.1988	39	5.39689	79	1.21330	119	0.36954
0	35.2024	40	5.17519	80	1.17393	120	0.35982
1	33.3269	41	4.96392	81	1.13604	121	0.35042
2	31.5635	42	4.76253	82	1.09958	122	0.3413
3	29.9058	43	4.57050	83	1.06448	123	0.33246
4	28.3459	44	4.38736	84	1.03069	124	0.32390
5	26.8778	45	4.21263	85	0.99815	125	0.31559
6	25.4954	46	4.04589	86	0.96681	126	0.30754
7	24.1932	47	3.88673	87	0.93662	127	0.29974
8	22.5662	48	3.73476	88	0.90753	128	0.29216
9	21.8094	49	3.58962	89	0.87950	129	0.28482
10	20.7184	50	3.45097	90	0.85248	130	0.27770
11	19.6891	51	3.31847	91	0.82643	131	0.27078
12	18.7177	52	3.19183	92	0.80132	132	0.26408
13	17.8005	53	3.07075	93	0.77709	133	0.25757
14	16.9341	54	2.95896	94	0.75373	134	0.25125
15	16.1156	55	2.84421	95	0.73119	135	0.24512
16	15.3418	56	2.73823	96	0.70944	136	0.23916
17	14.6181	57	2.63682	97	0.68844	137	0.23338
18	13.9180	58	2.53973	98	0.66818	138	0.22776
19	13.2631	59	2.44677	99	0.64862	139	0.22231

## Appendix 2

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