

# NORTEK GLOBAL HVAC, LLC

## DC Inverter Multi VRF System

### Owner's Manual

### Heat Pump

Applicable Models:

V5BV-36WMAK

V5BV-48WMAK

V5BV-60WMAK

- Please read this owner's manual carefully before operation and retain it for future reference
- Specifications & illustrations subject to change without notice or incurring obligations

## Preface

The DC Inverter Multi VRF System, with the most advanced technology in the world, uses eco-friendly refrigerant R410A. For correct installation and operation, please read this manual carefully. Before reading the manual, please note that:

- (1) Multi VRF system conforms to design standard: ARI 210240-2008
- (2) To ensure safety when operating this system, please strictly follow the instructions in this manual.
- (3) The total capacity of running indoor units must not exceed that of the outdoor units.
- (4) Make sure that this manual is kept for future reference.
- (5) In case of malfunction, please check the following items and contact a qualified technician as soon as possible.
  - 1) Nameplate (model, cooling capacity, product code, manufacture date)
  - 2) Malfunction status (detail description of conditions before and after malfunction occurs)
- (6) All units have been strictly tested and proved to be qualified before shipment. To avoid damage or operation failure which may be caused by improper service, please contact a qualified service technician.
- (7) All graphics and information in this manual are only for reference. Manufacturer reserves the right for changes in terms of sales or production at any time and without prior notice.
- (8) Under standby status, the unit will use a little power when not running for normal communication and preheating of refrigerant. If the system won't be used for an extended period, turn off the power of the complete unit. However, the system will require preheating the next time it is used.

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## 1 Safety Precautions

<b>▲WARNING</b>	WARNING NOTICE: Failure to comply with warning notice could result in property damage, serious personal injury or death...
<b>▲CAUTION</b>	CAUTION NOTICE: Failure to comply with caution notice could result in property damage or personal injury.
<b>NOTICE</b>	NOTICE: Failure to comply with notice could result in property damage..

<b>▲WARNING</b>	
(1)	Instructions for installation and use of this product are provided by the manufacturer.
(2)	Installation must be performed by qualified personnel only.
(3)	Please follow installation instructions as outlined in this manual.
(4)	Use appropriate pipe connection material and appropriate electrical cord as outlined in this manual.
(5)	Before installation, check the power cord if it complies with the power supply requirement on the nameplate. Make sure the power supply is safe.
(6)	This air conditioner must be properly grounded through the receptacle to avoid electric shock. The ground wire shouldn't be connected to gas pipe, water pipe, lightning rod or telephone line.
(7)	If refrigerant leaks while work is being carried out, ventilate the area. If the refrigerant comes in contact with a flame, it produces toxic gas.
(8)	Do not power on until all installation work is complete.
(9)	During installation, make sure that the refrigerant pipe is attached firmly before you run the compressor. Do not operate the compressor with gas pipe and liquid pipe valve open. This may cause abnormal pressure in the refrigeration cycle that leads compressor damage or personal injury.
(10)	During the pump-down operation, make sure that the compressor is turned off before you remove the refrigerant piping. This may cause abnormal pressure in the refrigerant cycle that leads to compressor damage or personal injury.
(11)	When installing the air conditioner, do not mix gases other than the specified refrigerant (R410A) to enter the refrigerant cycle.
(12)	If air or other gas enters the refrigerant cycle, the pressure inside the cycle will rise to an abnormally high value and cause compressor damage or personal injury.
(13)	This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge..
(14)	Children should be supervised to ensure that they do not play with the appliance.
(15)	If the supply cord is damaged, it must be with an appropriate size cord.
(16)	When installing, approved parts and accessories must be used. Otherwise, it may result in water leakage, electric shock or fire hazard.
(17)	Diameter of power cord must be large enough. Damaged power cord or connecting wire must be replaced by approved electric cable.
(18)	After the power cord is connected, please install the cover of electric box to avoid danger
(19)	Nitrogen must be charged according to technical requirements.
(20)	For units with wired controllers, do not connect power supply until the wired controller is connected. Otherwise, the wired controller may be damaged.
(21)	When installation is finished, please check and make sure the drain pipe, pipeline and electric wire are all well connected so as to avoid water leakage, refrigerant leakage, electric shock and fire hazard.
(22)	Do not insert fingers or objects into air outlet or return air grille.
(23)	If you use gas heater or petroleum heater in the same room, please open the door or window to maintain good air ventilation.

## DC Inverter Multi VRF System

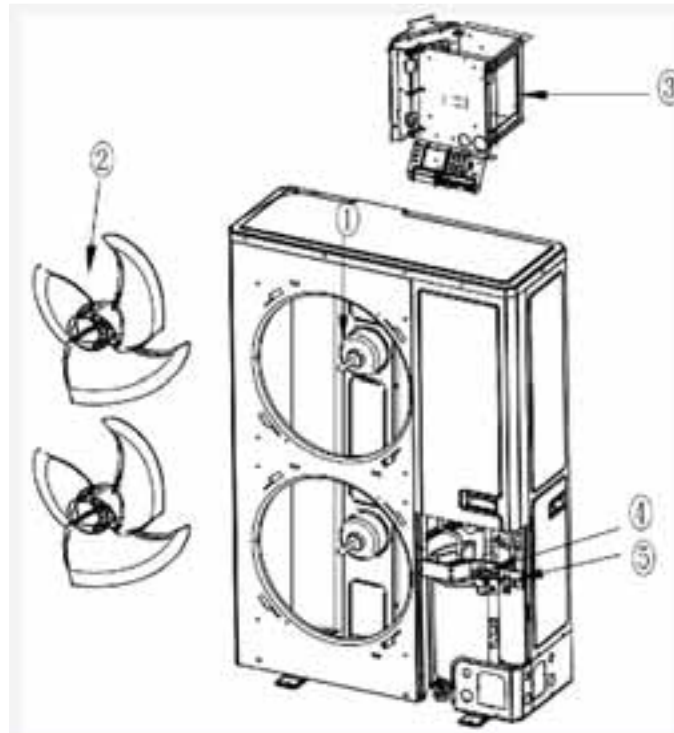
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(24) Never start or stop the air conditioner by plugging or unplugging the power cord.
(25) Do not turn off the air conditioner until it runs for at least 5 minutes. Otherwise, the compressor oil return system will malfunction.
(26) Children are not allowed to operate the air conditioner.
(27) Do not operate the air conditioner with wet hands.
(28) Please turn off and unplug your air conditioner before cleaning. Otherwise, it may cause electric shock or personal injury.
(29) Do not spray water on the air conditioner or it will cause malfunction or electric shock.
(30) Do not expose the air conditioner directly to damp or corrosive environment.
(31) Connect power 8 hours before startup operation. Do not disconnect power when you want to stop the unit for a short period of time, e.g. in one night. (This is may cause damage to the compressor.)
(32) Volatile liquid like paint thinner or gasoline will damage the appearance of air conditioner. (Please use soft dry cloth or damp cloth with mild detergent to clean unit's outer case.)
(33) Under cool mode, do not set the indoor temperature too low. Keep the difference between indoor temp and outdoor temp within 5°C (9°F).
(34) If abnormal condition occurs (e.g. unpleasant smell), please turn off the unit at once and disconnect power supply. If the air conditioner continues to operate abnormally, it may be damaged and cause electric shock or fire hazard.). Contact a qualified HVAC technician.
(35) Do not repair the air conditioner by yourself. Improper repair will cause electric shock or fire hazard. Contact a qualified HVAC technician for service.
(36) Manufacturer will not assume responsibility for any personal injury or property loss caused by improper installation, improper debugging, unnecessary repair or not following the instructions of this manual.

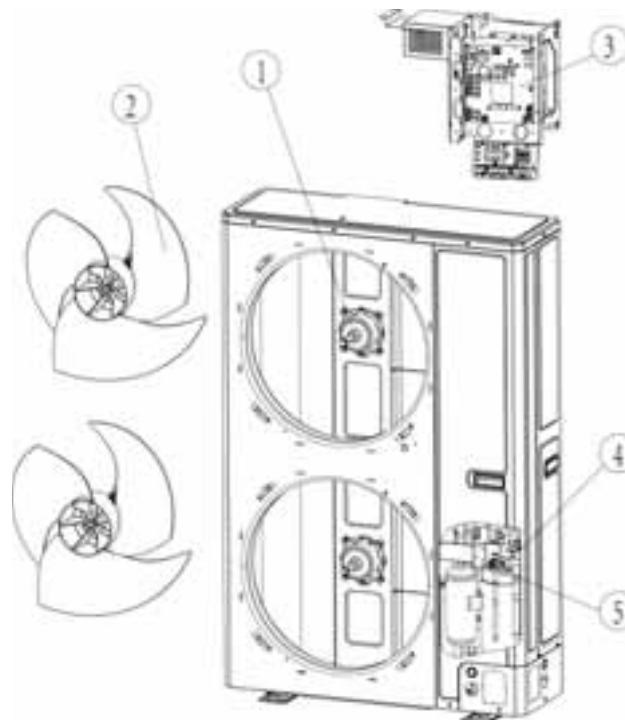
## 2 Product Introduction

This equipment uses inverter compressor technology. This allows the compressor to modulate at a range of 15%~100%...

### 2.1 Names of Main Parts



V5BV-36WMAK  
V5BV-48WMAK



V5BV-60WMAK

Fig.1

No.	①	②	③	④	⑤
Name	Motor	Fan blade	Electric box assembly	Gas pipe valve	Liquid pipe valve

## 2.2 Combinations of Indoor and Outdoor Units

- (1) See below the number of indoor units that can be connected to the outdoor unit.
- (2) The total capacity of indoor units should be within 50%~135% of that of the outdoor unit.

Model	Min sets of connectable IDUs	Max sets of connectable IDUS
V5BV-36WMAK	2	7
V5BV-48WMAK	2	8
V5BV-60WMAK	2	13

- (3) Outdoor DC Inverter Multi VRF System units can be connected to various indoor units.  
As indoor units start or stop, outdoor unit will adjust as per required capacity. When all indoor units stop, outdoor unit will be shut off.

## 2.3 Operating Range


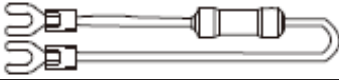


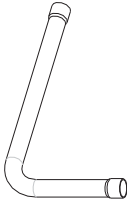
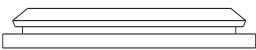
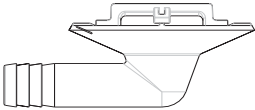
Cooling	Outdoor temperature: -5°C~48°C(23°F~118°F)
Heating	Outdoor temperature: -20°C~27°C(-4°F~81°F)

### 3 Preparation before Installation

**NOTICE!** Graphics here are only for reference. Please refer to actual products.

#### 3.1 Standard Parts

Please use the supplied standard parts as required.

Parts for Outdoor Unit				
No.	Name	Appearance	Qty	Remark
1	User Manual		1	
2	Wiring (match with resistance)		1	Must be connected to the last IDU of communication connection
3	Corrugated pipe		1	V5BV-36WMAK V5BV-48WMAK
4	Liquid side connection pipe		1	This part is included in the following models: V5BV-60WMAK
5	Gas side connection pipe		1	This part is included in the following models: V5BV-60WMAK
6	Drainage hole cap		3	
7	Drainage joint		1	



### 3.2 Installation Site

<b>▲WARNING</b>	
(1)	Check the support structure to verify that it has sufficient load-carrying capacity to support the weight of the unit, and it can be securely mounted.
(2)	Do not install where there is a danger of combustible gas leakage.
(3)	Do not install the unit near heat source, steam, or flammable gas.
(4)	Children should be kept away from unit.
(5)	Select a location which is out of children's reach. Keep the unit away from children.
(6)	Unit should be installed so that air flow pattern is free of obstruction.
(7)	Be sure to leave sufficient space around the unit for service and maintenance..
(8)	Install the unit level. It should not tilt by more than 5°.
(9)	The unit should be mounted securely to withstand high wind potential for your location.

<b>NOTICE</b>	
(1)	If possible, do not install the unit where it will be exposed to direct sunlight. (If necessary, install a blind that does not interfere with the air flow.)
(2)	Install ODU in a place where it will be free from dirt or rain as much as possible.
(3)	Install ODU where it is convenient to connect IDU.
(4)	ODU and IDU should be installed as close as possible to shorten the length of refrigerant pipe and reduce bend angles.
(5)	Install ODU where the condensate water can be drained out freely. Do not place animals and plants in the path of the warm air.
(6)	Check the support structure to verify that it has sufficient load-carrying capacity to support the weight of the unit. Mount the unit securely to reduce vibration noise

If the ODU is totally surrounded by walls, please refer to the following figures for clearances:

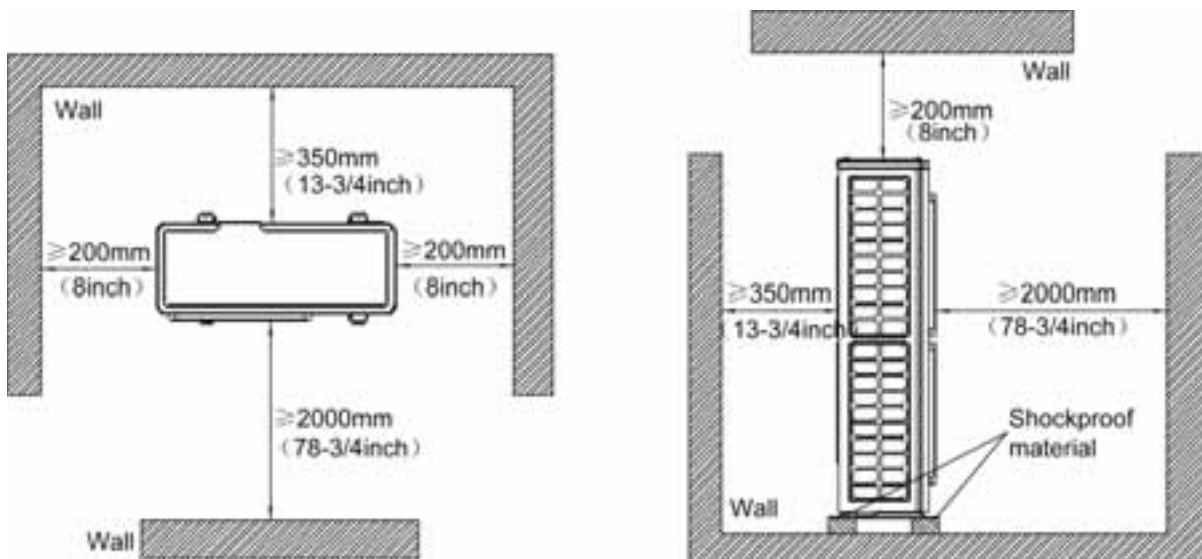


Fig.2

### 3.3 Piping Work Requirements

Refer to the table below for piping work requirements:

R410A Refrigerant System	
Outer diameter (mm/inch)	Wall thickness(mm/ inch)
Φ6.35(Φ1/4)	≥0.8(1/32)
Φ9.52(Φ3/8)	≥0.8(1/32)
Φ12.7(Φ1/2)	≥0.8(1/32)
Φ15.9(Φ5/8)	≥1.0(1/25)
Φ19.05(Φ3/4)	≥1.0(1/25)

## 4 Installation Instruction

**NOTICE!** Graphics here are for reference only. Please refer to actual products.

### 4.1 Dimension of Outdoor Unit and Mounting Hole

Unit Outline and Installation Dimension:

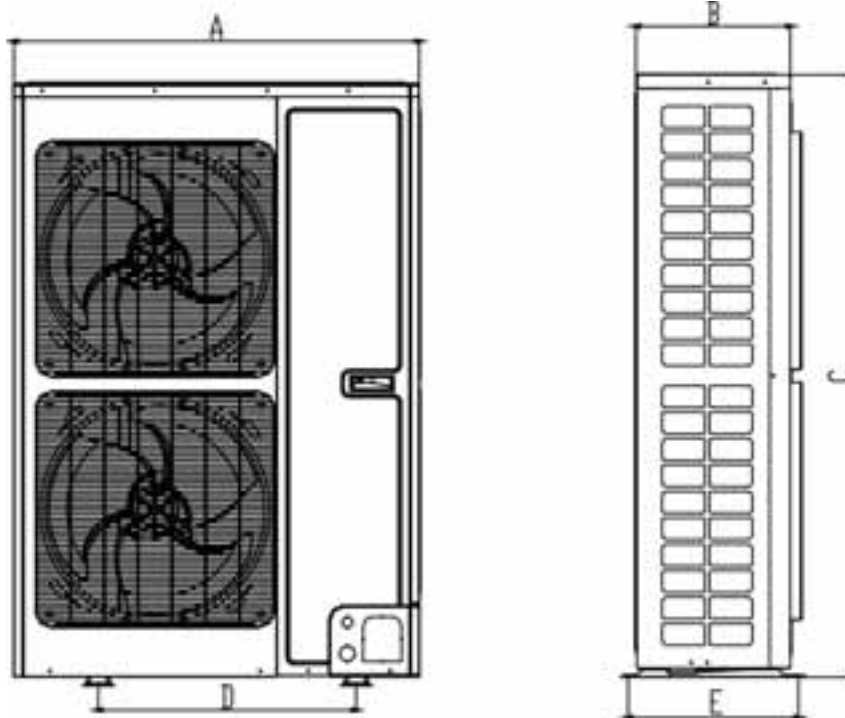


Fig.3

Unit:mm(inch)

Model	A	B	C	D	E
V5BV-36WMAK	900	340	1345	572	378
V5BV-48WMAK	(35-3/8)	(13-3/8)	(53)	(22-1/2)	(15)
V5BV-60WMAK	940	320	1430	632	350
	(37)	(12 3/5)	(56 2/7)	(24 7/8)	(14 7/8)

## 4.2 Connection Pipe

### 4.2.1 Schematic Diagram of Piping Connection

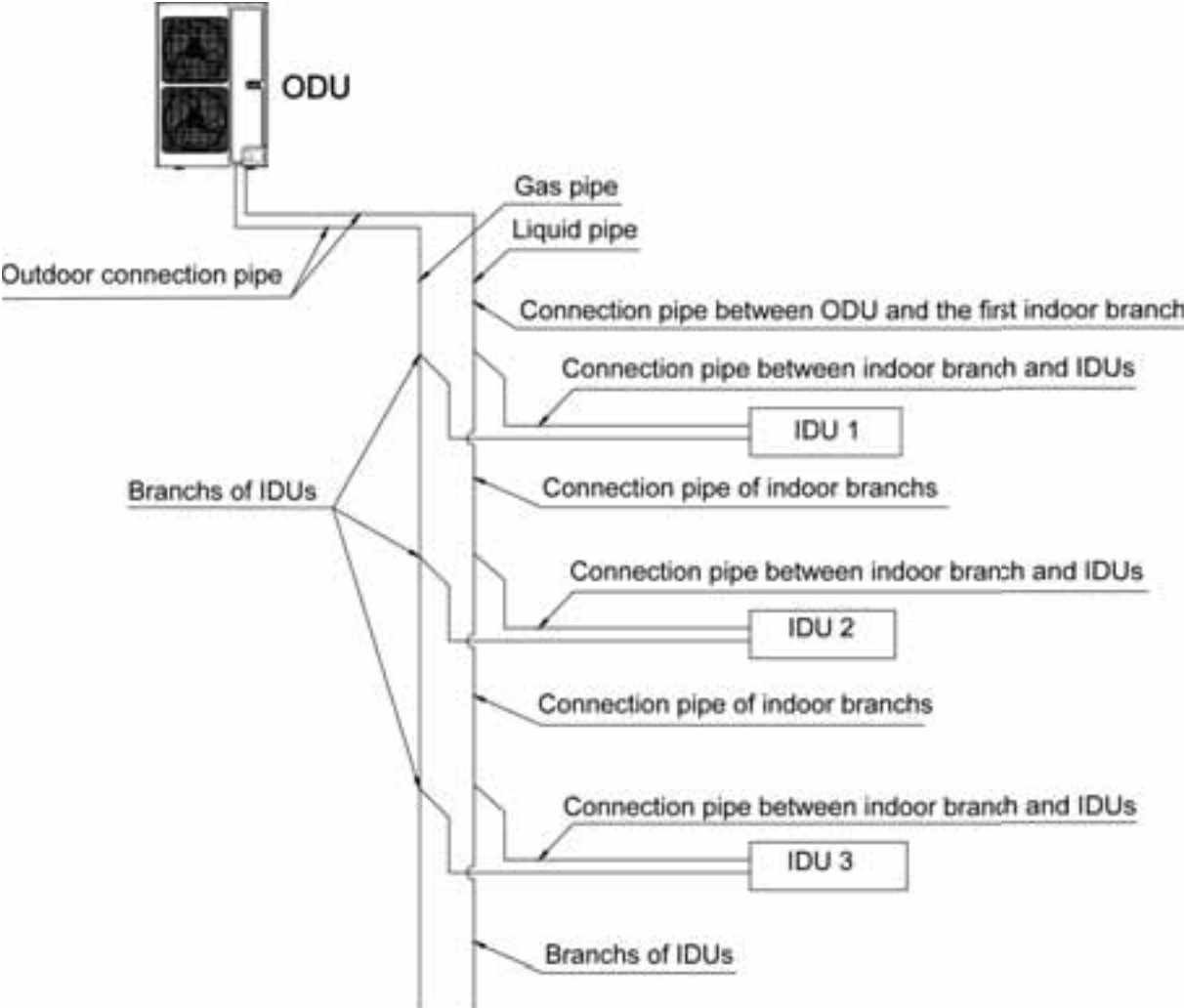
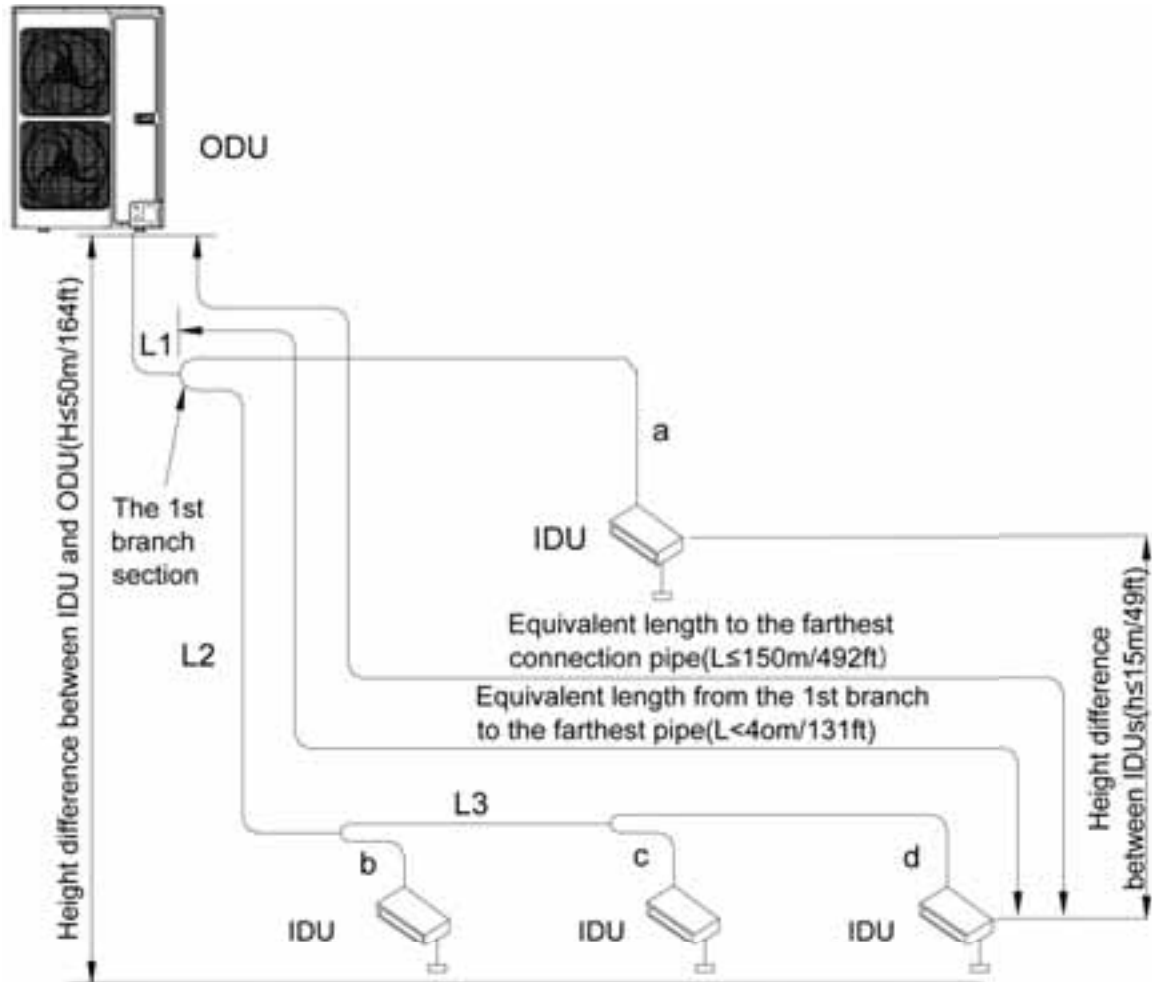


Fig.4

### 4.2.2 Allowable Length and Height Difference of Connection Pipe

Y type branch joint is used to connect indoor and outdoor units. Connecting method is shown in the figure below:

**NOTICE!** Equivalent length of one Y-type branch is 0.5m(1-1/2 feet).



Each Y-type branch equals to 0.5m(1-5/8ft) and each branch header equals to 1.0m(3-1/4ft).

Fig.5 Allowable Length and Height Difference of Connection Pipe

Piping parameters of V5BV-36WMAK、V5BV-48WMAK、V5BV-60WMAK

		Allowable value		Fitting pipe
		m	feet	
Total length of fitting pipe		300	1000	L1+L2+L3+a+b+c+d
Length from farthest fitting pipe	120	120	400	L1+L2+L3+d
	150	150	500	
From the 1 <sup>st</sup> branch to the farthest indoor pipe		40	130	L2+L3+d
Height difference between ODU and IDU	50	50	165	—
	40	40	130	—
Height difference between IDUs		15	50	—

### 4.2.3 Dimension of Pipe (Main Pipe) from ODU to the 1st Indoor Branch

Dimension of pipe from ODU to the 1<sup>st</sup> indoor branch will be determined by the dimension of outdoor connection pipe.

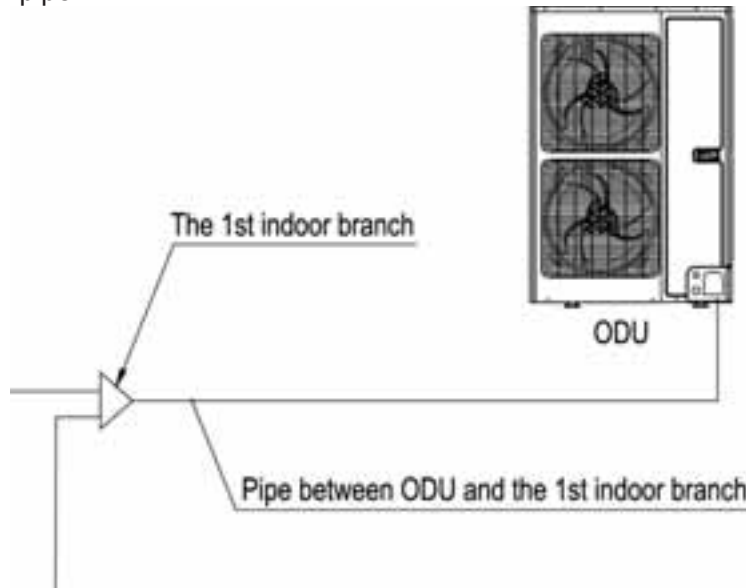


Fig. 6

Dimension of outdoor connection pipe:

Basic module	Pipe dimension	
	Gas pipe (mm/inch)	Liquid pipe (mm/inch)
V5BV-36WMAK	φ15.9 (φ5/8)	φ9.52 (φ3/8)
V5BV-48WMAK	φ15.9 (φ5/8)	φ9.52 (φ3/8)
V5BV-60WMAK	Φ19.05 (φ3/4)	φ9.52 (φ3/8)

### 4.2.4 Selection of Indoor Branches

Select indoor branches according to the total capacity of downstream indoor units.

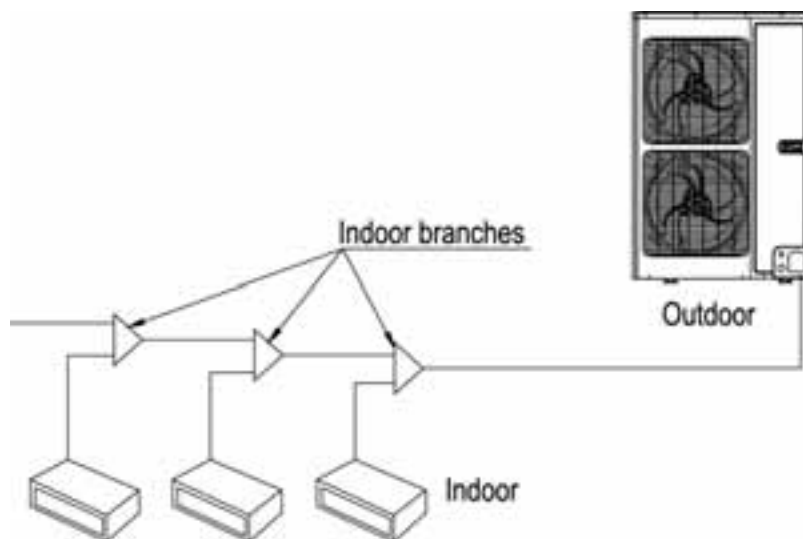


Fig.7

Refrigerant system	Total capacity of downstream indoor units C (Btu/h)	Model
Y type branch	$C < 68200$	FQ01A
	$68200 \leq C \leq 102400$	FQ01B
	$102400 < C \leq 238800$	FQ02
	$238800 < C \leq 460600$	FQ03
	$460600 < C$	FQ04

#### 4.2.5 Dimension of Pipe between Indoor Branches

Select pipe between indoor branches according to the capacity of downstream indoor units; if the capacity exceeds that of the outdoor unit, capacity of outdoor unit prevails.

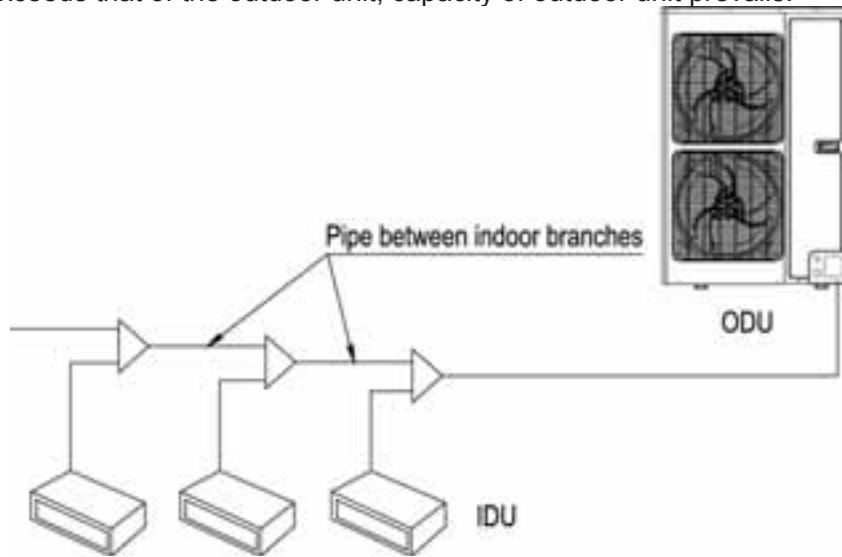


Fig.8

Total capacity of downstream indoor units C (Btu/h)	Pipe (mm/inch)	Liquid pipe (mm/inch)
$C \leq 19000$	$\Phi 12.7$ ( $\Phi 1/2$ )	$\Phi 6.35$ ( $\Phi 1/4$ )
$19000 < C \leq 48500$	$\Phi 15.9$ ( $5/8$ )	$\Phi 9.52$ ( $3/8$ )
$48500 < C \leq 76400$	$\Phi 19.05$ ( $\Phi 3/4$ )	$\Phi 9.52$ ( $\Phi 3/8$ )

### 4.2.6 Dimension of Pipe between Indoor Branch and IDU

Dimension of pipe between indoor branch and IDU should be consistent with the dimension of indoor pipe.

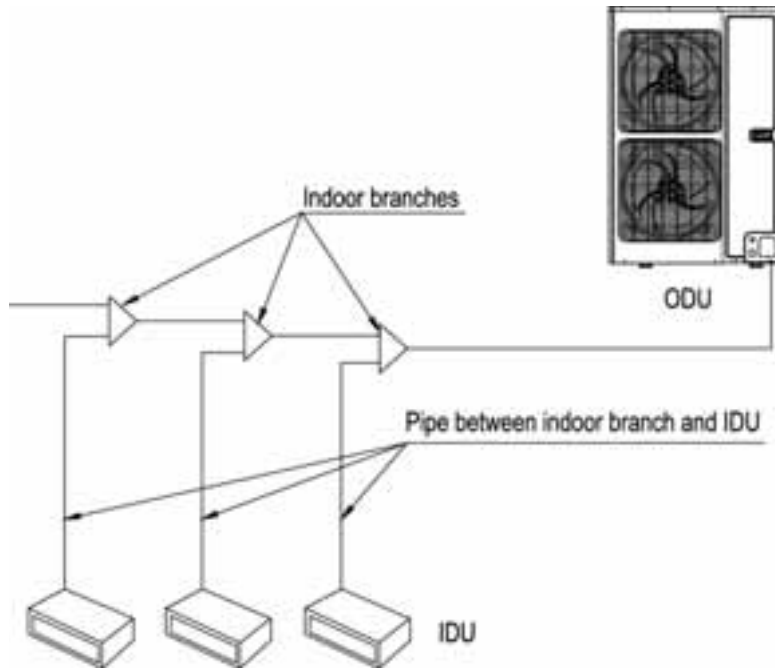


Fig. 9

Rated capacity of IDU C(Btu/h)	Gas pipe (mm/inch)	Liquid pipe (mm/inch)
$C \leq 9600$	$\Phi 9.52$ ( $\Phi 3/8$ )	$\Phi 6.35$ ( $\Phi 1/4$ )
$9600 < C \leq 17000$	$\Phi 12.7$ ( $\Phi 1/2$ )	$\Phi 6.35$ ( $\Phi 1/4$ )
$17000 < C \leq 48000$	$\Phi 15.9$ ( $\Phi 5/8$ )	$\Phi 9.52$ ( $\Phi 3/8$ )
$48000 < C \leq 55000$	$\Phi 19.05$ ( $\Phi 3/4$ )	$\Phi 9.52$ ( $\Phi 3/8$ )
$55000 < C \leq 96000$	$\Phi 22.2$ ( $\Phi 7/8$ )	$\Phi 9.52$ ( $\Phi 3/8$ )

**NOTICE!** If the distance between IDU and its nearest branch is over 10m(33feet), then the liquid pipe of IDU (rated capacity  $\leq 17000$ Btu/h) shall be enlarged.

### 4.3 Installation of Connection Pipe

<b>⚠ CAUTION</b>	
(1)	Observe the following during pipe connection: Connection pipe should be as short as possible. Height difference between indoor and outdoor units should be as short as possible. Keep the number of bends as few as possible. Radius of curvature should be as large as possible.
(2)	Weld the connection pipe between indoor and outdoor units. Strictly follow the requirements for welding process. Rosin joint or pin hole is not allowed.
(3)	When laying the pipe, be careful not to distort it. Radius of bending parts should be over 200mm(8inch). Note that pipes cannot be repeatedly bent or stretched; otherwise it will become brittle and break. Do not bend or stretch the pipe for more than 3 times at the same position.



### 4.3.1 Flaring Process

- (1) Use pipe cutter to cut pipe to avoid misshaping.
- (2) Keep the pipe downward in case cutting scraps get into the pipe. Clear away the burrs after cutting.
- (3) Remove the flared nut from the valve on both the indoor and outdoor units. Then use flaring tool to fix the flared nut into the pipe (as shown in Fig.10).
- (4) Check if the flared part is flaring evenly and if there is no crack.

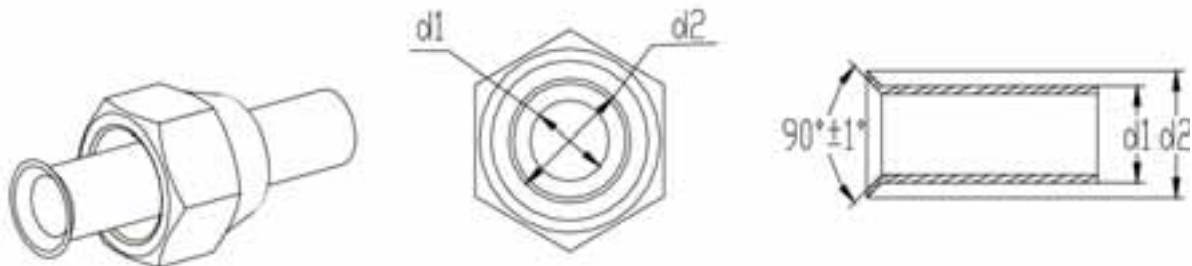


Fig. 10

### 4.3.2 Pipe Bending

- (1) Extend the pipe by hand. Be careful not to crimp it.
- (2) Do not bend the pipe more than 90°.
- (3) If pipe is repeatedly bent or stretched, it will weaken making it more likely to break. Do not bend or stretch the bend for over 3 times.
- (4) For best results, cut insulation before bending, as shown in Fig.12. Bend pipe as needed and secure insulation with tape.

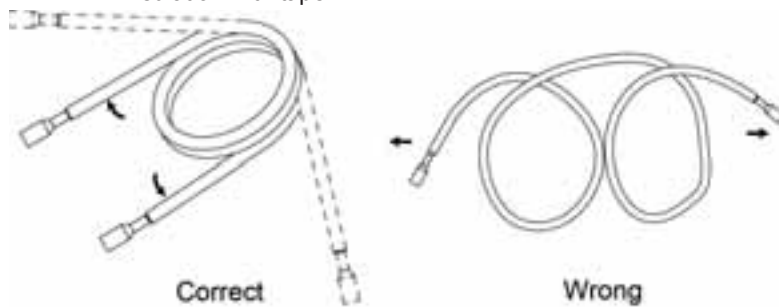


Fig. 11

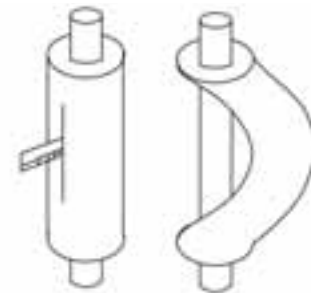


Fig. 12

### 4.3.3 Indoor Pipe Connection

- (1) Remove pipe cover and pipe plug.
- (2) Direct the flared part of copper pipe to the center of screwed joint. Twist on the flared nut tightly by hand, as in Fig. 13. (Make sure indoor pipe is correctly connected. Improper alignment of the center will prevent flared nut from being securely fastened. Thread of nut will get damaged if not aligned correctly.)
- (3) Use torque wrench to tighten the flared nut until the wrench gives out a click sound. (Hold the handle of wrench at right angle to the pipe. as in Fig. 14)

**CAUTION**

- (1) Use sponge to wrap the un-insulated connection pipe and joint. Then secure the sponge tightly with plastic tape.
- (2) Connection pipe should not be supported by the unit.
- (3) The bending angle of piping should not be too small; otherwise the piping might have cracks. Please use a pipe bender to bend the pipe.
- (4) When connecting IDU with connection pipe, do not pull on the pipe or pipe joints in case the capillary tube or other tubes have cracks and cause leakage.

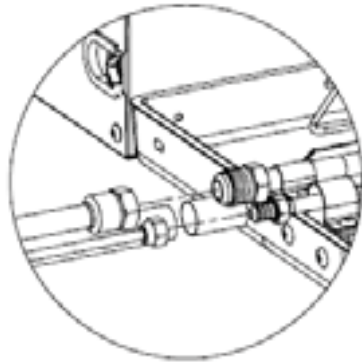


Fig. 13

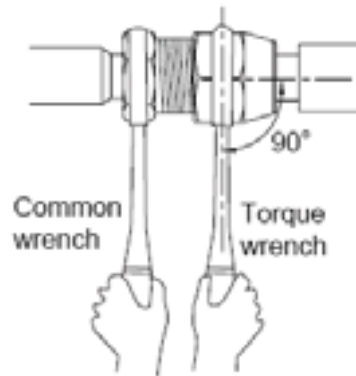


Fig. 14

Pipe Diameter	Tightening Torque
6mm(1/4inch)	15-30N·m(11-22ft.-lb.)
9.5mm(3/8 inch)	35-40N·m(26-29ft.-lb.)
12.7mm(1/2 inch)	45-50N·m(33-37ft.-lb.)
16mm(5/8 inch)	60-65N·m(44-48ft.-lb.)

#### 4.3.4 Outdoor Pipe Connection

Twist the flared nut on the connection pipe of outdoor valves. Twisting method is the same as for indoor pipe connection.

According to customer requirement or space limit, outlet pipe can be installed from the front, right or rear side.

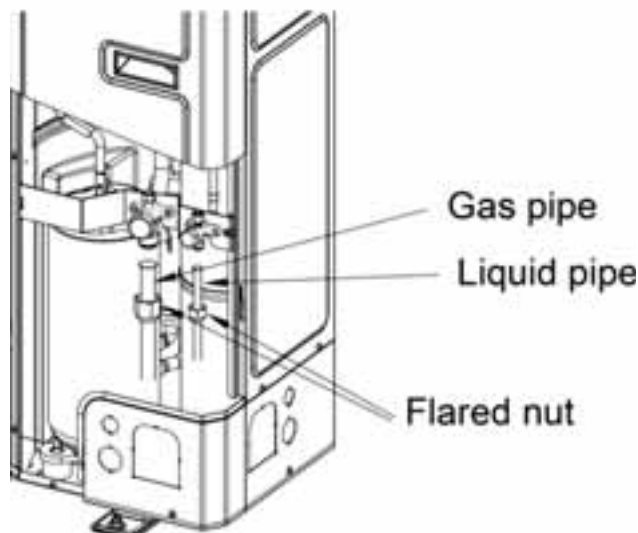


Fig. 15

As shown in Fig.16 and Fig.17, open the outermost soundproof cotton and place a fire barrier between compressor and straight pipe. Use a soldering gun to unsolder straight pipe 1 and straight pipe 2. Install connection pipe 1 and connection pipe 2 to the corresponding position and then seal the apertures with welding rod. First weld the liquid side connection pipe and then weld the gas side connection pipe. During welding, it's necessary to use wet gauze to wrap up the two cut-off valves. Make sure the flame won't burn the soundproof cotton or other components.

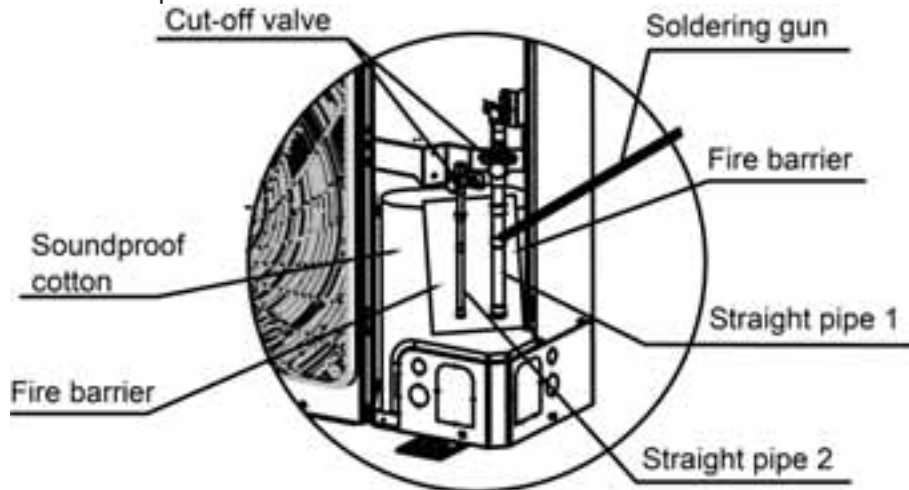


Fig. 16  
Welding rod

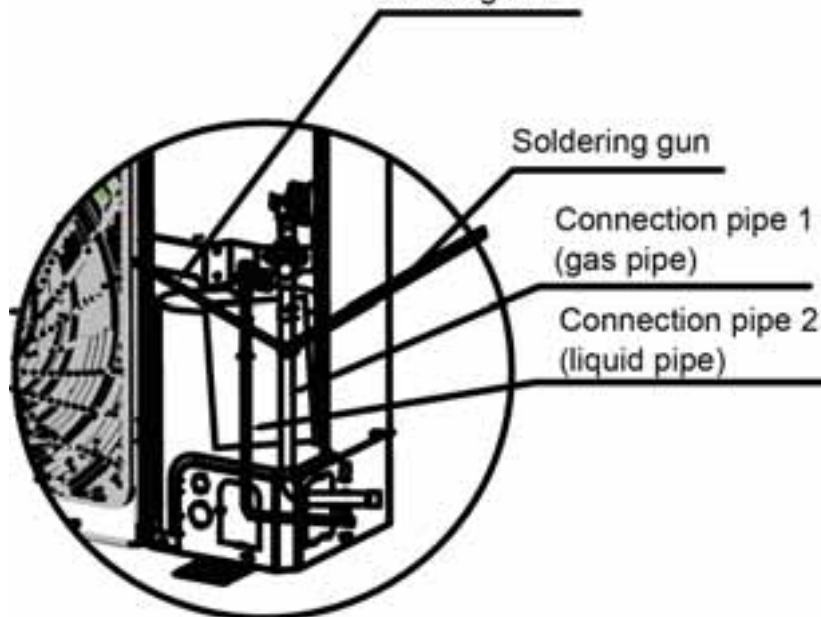


Fig. 17

### 4.3.5 Installation of Y-type Branch

(1) Y-type Branch

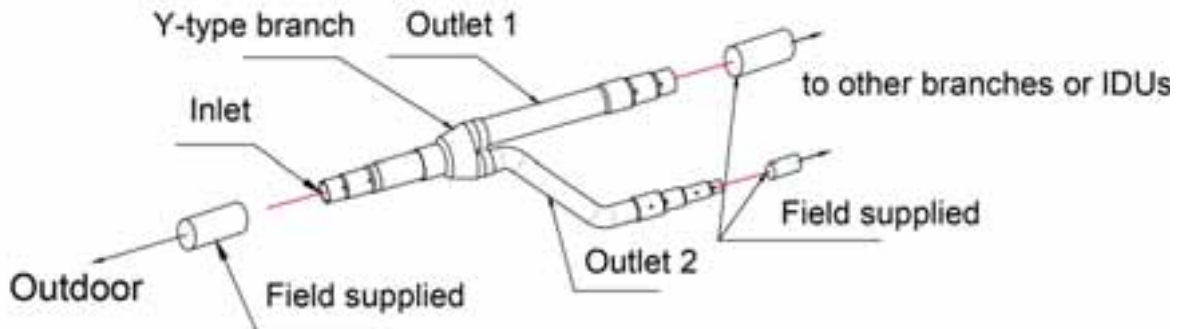


Fig. 18

(2) Y-type branch has several pipe sections with different dimensions, which facilitates matching to various copper pipes. Use pipe cutter to cut in the middle of the pipe section and remove burrs. See Fig. 17.

(3) Y-type branch must be installed vertically or horizontally.

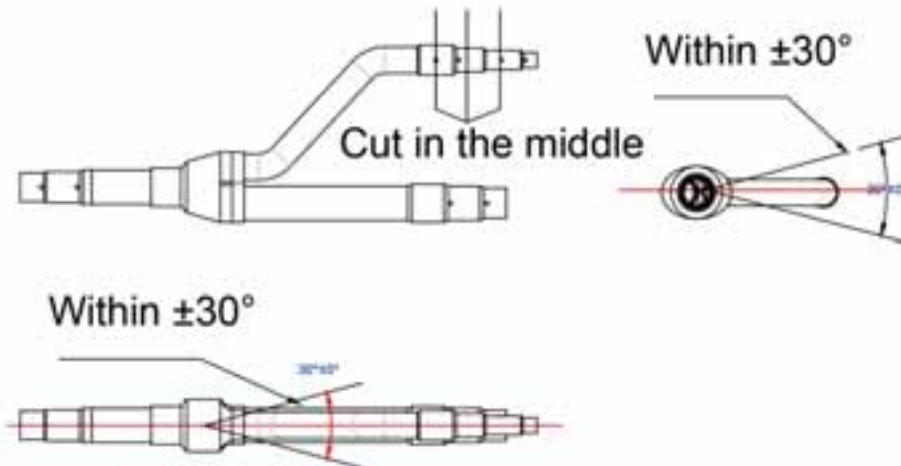


Fig. 19

## NOTICE

Branch shall be isolated by insulating material that can bear 120°C(248°F) or even higher temperature. The foam attached to the branch is not considered as insulating material.

### 4.3.6 Thermal Insulation for Pipeline

- (1) For multi VRF system, every copper pipe should be labeled so as to avoid misconnection.
- (2) At the branch inlet, leave at least 500mm(19-3/4inch) straight pipe section.
- (3) Thermal insulation for pipeline
  - 1) To avoid condensate or water leakage on the connection pipe, the gas pipe and liquid pipe must be wrapped with thermal insulating material and adhesive.
  - 2) Joints of indoor and outdoor unit should be wrapped with insulating material leaving no gap between pipe and wall. See Fig. 20.

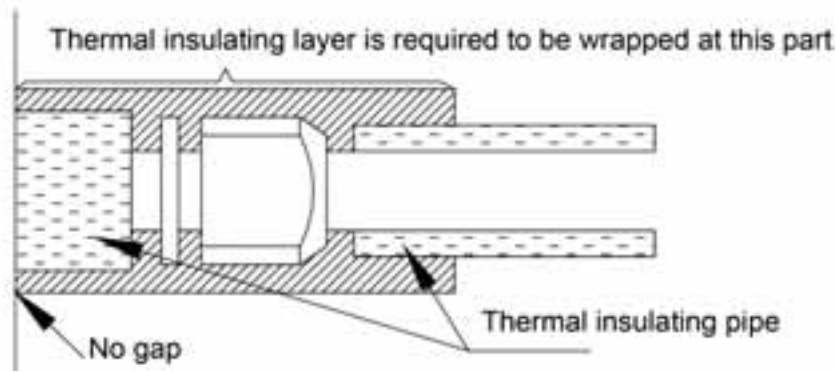


Fig. 20

- 3) When wrapping the tape, half of the width of the tape should cover the previous layer of tape. Don't wrap the tape too tight, or insulation effectiveness will be comprised.
- 4) After wrapping the pipe, apply sealing material around the hole on the wall.

### **NOTICE**

- (1) Thermal insulating material shall be able withstand the pipe temperature. For heat pump unit, liquid pipe should withstand 70°C(158°F) or above and gas pipe should withstand 120°C(248°F) or above. For cooling only unit, both liquid pipe and gas pipe should withstand 70°C(158°F) or above.
- (2) Thermal insulating material of branches should be the same as that of the pipeline. The attached foam of branches alone cannot be substituted for insulating material.

#### 4.3.7 Support and Protection of Pipeline

### **CAUTION**

- (1) Support should be made for hanging connection pipe. Distance between each support cannot be over 1m(3 feet).
- (2) Protection against accidental damage should be made for outdoor pipeline. When pipeline exceeds 1m(3 feet), a pinch board should be added for protection.

#### 4.4 Disassembly of Compressor Feet

In order to prevent unit from damage during transportation, 2 metal pieces are fitted to outdoor unit's compressor feet before unit leaves factory. See fig. 21.

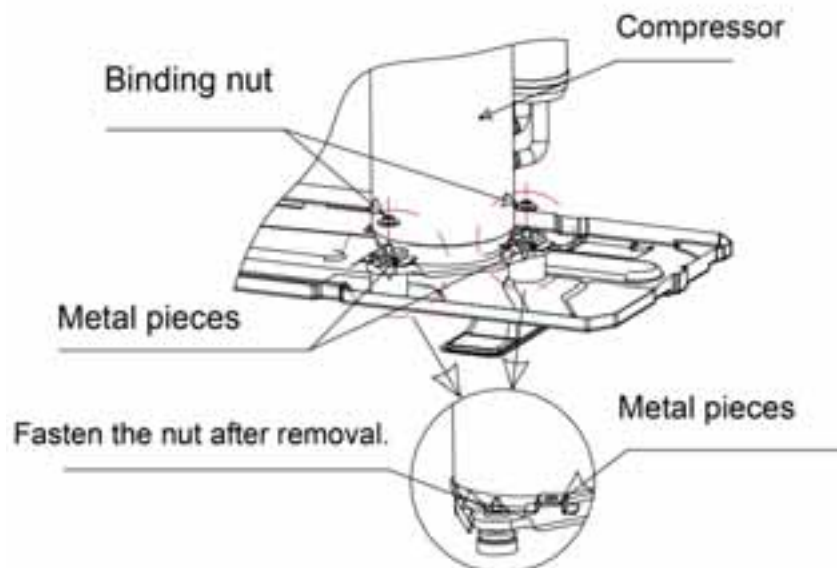


Fig. 21

When installing the unit, metal pieces for transportation must be removed. Then fasten the

binding nuts again and replace soundproofing cotton. If unit runs with metal pieces fitting on, compressor will vibrate and unit's operating life will be shortened.

### 4.5 Vacuum Pumping, Adding Refrigerant

**⚠ CAUTION**

Do not purge the air with refrigerants but use a vacuum pump to vacuum the installation! There is no extra refrigerant in the outdoor unit for air purging!

#### 4.5.1 Vacuum Pumping

- (1) Outdoor unit has been charged with refrigerant before delivery. Field-installed connection pipe needs to be charged with additional refrigerant.
- (2) Confirm whether outdoor liquid and gas valves are closed.
- (3) Use vacuum pump to withdraw the air inside indoor unit and connection pipe from the outdoor valve, as shown below.

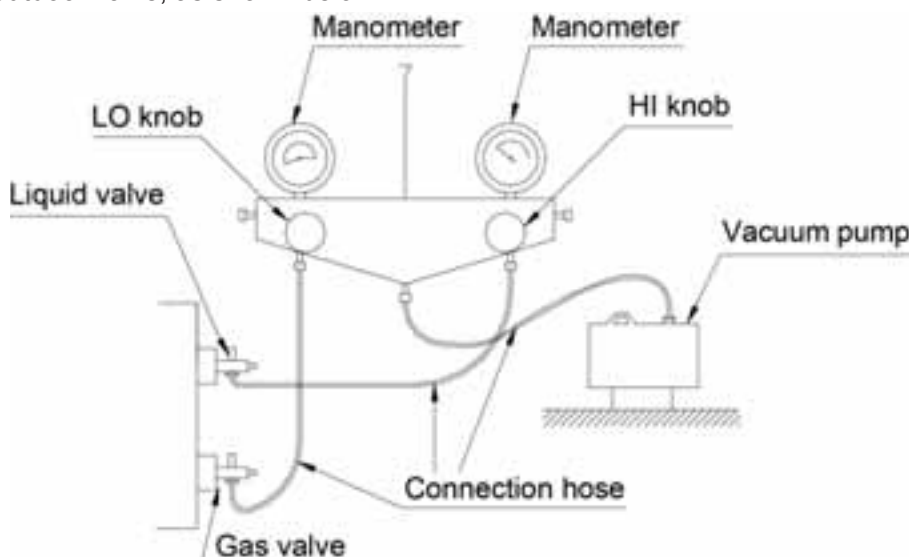


Fig. 22

#### 4.5.2 Adding Refrigerant

- (1) Refrigerant quantity of outdoor unit before delivery:

Model	V5BV-36WMAK	V5BV-48WMAK	V5BV-60WMAK
Refrigerant Qty (kg/lb)	5.0 (11)	5.0 (11)	6.5 (14)

**NOTICE**

- (1) The refrigerant amount charged before delivery doesn't include the amount that needs to be added to indoor units and the connection pipeline.
- (2) Length of connection pipe is determined on site. Therefore the amount of additional refrigerant shall be determined according to the dimension and length of field-installed liquid pipe.
- (3) Record the amount of additional refrigerant for future service reference.

- (2) Calculation of the amount of additional refrigerant

Calculation method of the quantity of additional refrigerant (based on liquid pipe)

Quantity of additional refrigerant =  $\sum$ length of liquid pipe X quantity of additional refrigerant per meter(39-3/8inch)

Diameter of liquid pipe (mm/inch)	Φ22.2 (Φ7/8)	Φ19.05 (Φ3/4)	Φ15.9 (Φ5/8)	Φ12.7 (Φ1/2)	Φ9.52 (Φ3/8)	Φ6.35 (Φ1/4)
kg/m	0.35	0.25	0.17	0.11	0.054	0.022
oz/inch	0.314	0.224	0.152	0.099	0.048	0.020

**NOTICE!** Liquid pipe that is within 20m (65 feet) doesn't need added refrigerant.

First confirm that there is no leakage from the system. When compressor is not working, charge additional R410a with specific amount to the unit through the filling opening of the liquid pipe valve of the outdoor unit. If required amount cannot be quickly filled due to pressure increase of the pipe, set the unit in cooling startup and fill refrigerant from the low pressure check valve of the outdoor unit.

(3) Calculation example

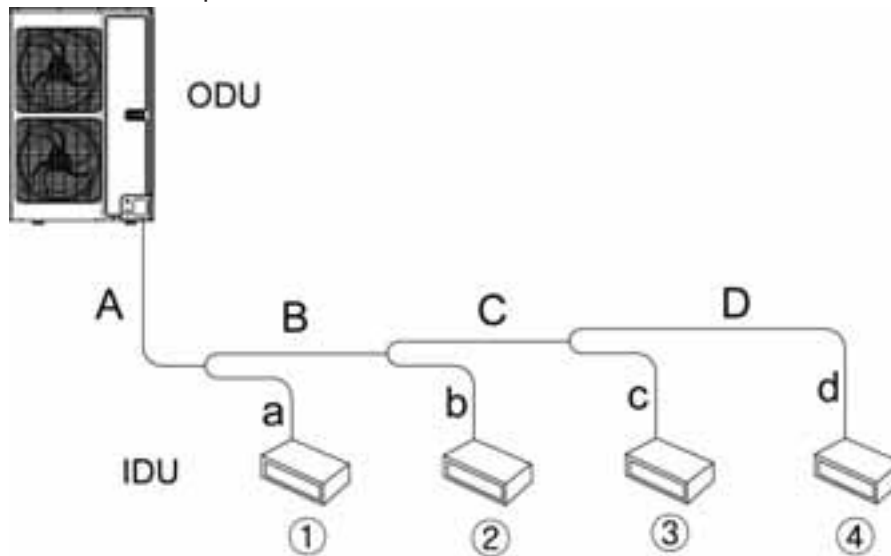


Fig. 23

IDU

No.	IDU ①	IDU ②	IDU ③	IDU ④
Model	Duct type BDDL-5.6(18)SAK	Duct type BDDL-3.6(12)SAK	Duct type BDDL-2.8(09)SAK	Duct type BDDL-2.8(09)SAK

Liquid pipe:

No.	A	B	C	D
Pipe size	φ9.52mm (φ3/8inch)	φ9.52mm (φ3/8inch)	φ9.52mm (φ3/8inch)	φ6.35mm (φ1/4inch)
Length	10m (32-3/4feet)	5m (16-3/8feet)	5m (16-3/8feet)	5m (16-3/8feet)
No.	a	b	c	d
Pipe size	φ9.52mm (φ3/8inch)	φ6.35mm (φ1/4inch)	φ6.35mm (φ1/4inch)	φ6.35mm (φ1/4inch)
Length	3m (9-3/4feet)	3m (9-3/4feet)	2m (6-5/8feet)	1m (3-1/4feet)

Total length of each liquid pipe

φ9.52:  $A+B+C+a=10+5+5+3=23\text{m}$

3/8Inch:  $A+B+C+a = 32-1/2 + 16-1/2 + 16-1/2 + 10 = 75-1/2 \text{ feet}$

φ6.35:  $D+b+c+d=5+3+2+1=11\text{m}$

¼ inch:  $D+b+c+d = 16-1/2 + 10 + 6-1/2 + 3 = 36$  feet

**NOTICE!** Liquid pipe that is within 20m(65-5/8 feet) doesn't need to be added with refrigerant.

Therefore, the minimum quantity of additional refrigerant =  $(23-20) \times 0.054 + 11 \times 0.022 = 0.404\text{kg}(14\text{oz})$

## 4.6 Electric Wiring

<b>⚠ WARNING</b>	
(1)	All electrical installation must be performed by qualified technicians in accordance with local and national codes, regulations and this user manual.
(2)	Use dedicated power supply and make sure that it is consistent with system's rated voltage.
(3)	Do not pull the power cord.
(4)	Caliber of the power cord must be appropriate for voltage. A damaged power cord or connection wire must be replaced by approved electrical cords.
(5)	Connect the unit to dedicated grounding device and make sure it is secure. Install an air switch with suitable capacity. Air switch should include magnet buckle and heating buckle function, it can protect the circuit-short and overload. (Caution: please do not use the fuse only to protect the circuit).
(6)	Air conditioner belongs to class I electrical appliance, so it must be securely grounded.
(7)	The yellow-green wire inside the unit is a ground wire. Do not cut it off or secure it with tapping screws, otherwise it will lead to electric shock.
(8)	Power supply must include secure grounding terminal. Do not connect the ground wire to the following: ①Water pipe; ②Gas pipe; ③Drain pipe; ④Other places that are deemed as not secure by professional electrician.

### 4.6.1 Electrical Wiring

(1). For solid core wiring (Fig.24)

- 1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation about 25mm (1 inch).
- 2) Using a screwdriver, remove the terminal screw(s) on the terminal board.
- 3) Using pliers, bend the solid wire to form a loop suitable for the terminal screw.
- 4) Shape the loop wire properly, place it on the terminal board and tighten the terminal screw using a screwdriver.

(2). For strand wiring (Fig. 25)

- 1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation about 10mm (3/8inch) .
- 2) Using a screwdriver, remove the terminal screw (s) on the terminal board.
- 3) Using a round terminal fastener or pliers, securely clamp a round terminal to each stripped wire end.
- 4) Position the round terminal wire, and replace and tighten the terminal screw with a screwdriver.(Fig. 26)



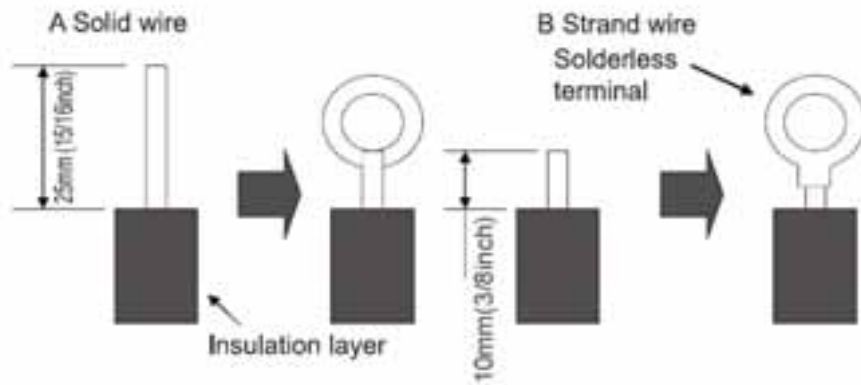


Fig. 24

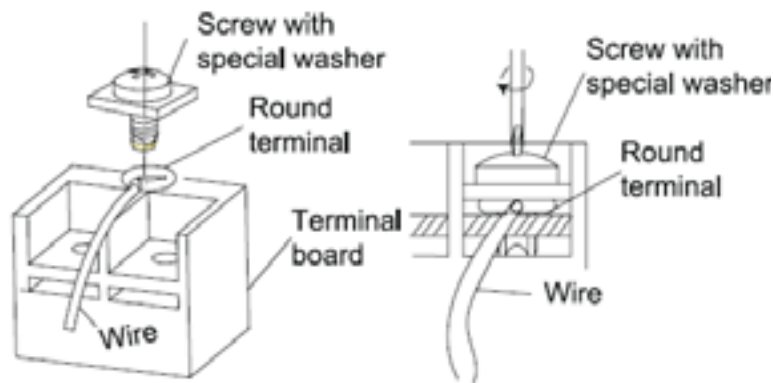


Fig. 25

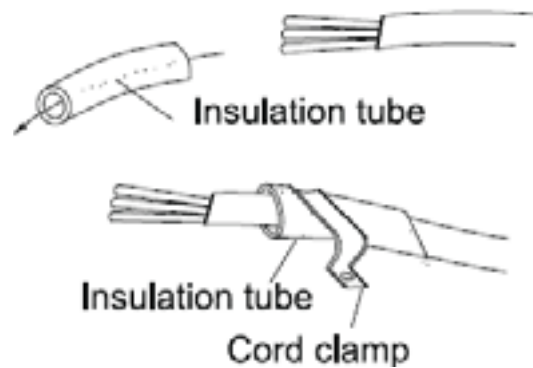


Fig. 26

(3). How to fix connection cord and power cord by cord clamp

After passing the connection cord and power cord through the insulation tube, fasten it with the cord clamp.(Fig. 26)

<b>⚠ WARNING</b>	
(1)	Before starting work, check that power is turned off.
(2)	Match the terminal block numbers and connection cord colors with those of the indoor unit. Improper wiring may cause damage to the electric parts.
(3)	Connect the connection cords firmly to the terminal block. Improper installation may cause a fire.
(4)	Always fasten the outside covering of the connection cord with cord clamps. (If the insulator is not clamped, electric short may occur.)
(5)	Always connect the ground wire.

### 4.6.2 Wiring Diagram

(1) Connection of power cord and communication wire

Separate power supply for IDU and ODU

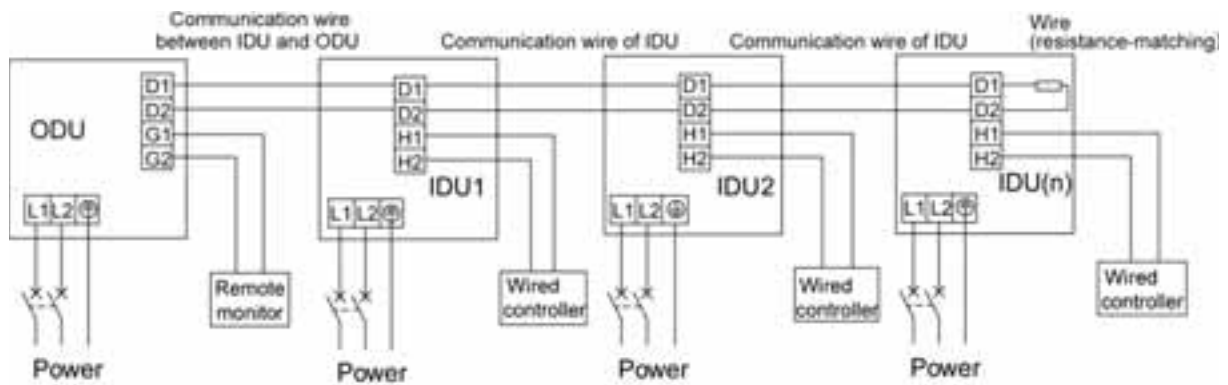


Fig.27 Connection of power cord and communication wire for IDU and ODU

(2) The wiring diagram for power cord and communication wire of outdoor unit.

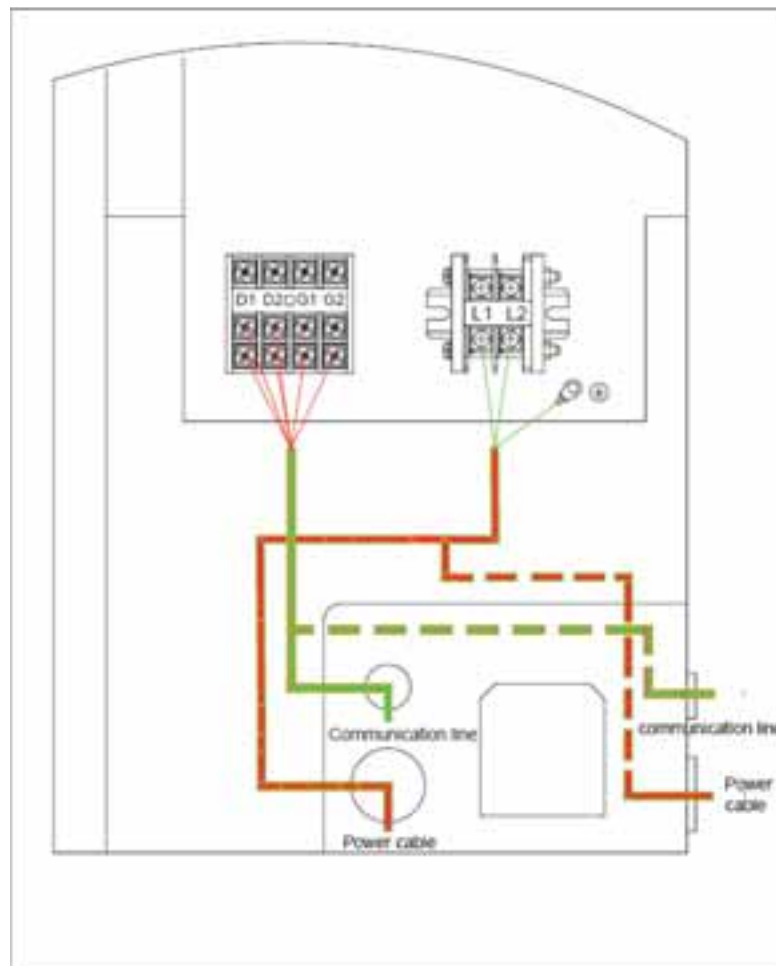


Fig.27

There are two wiring diagrams for communication wires of indoor/outdoor units and remote monitor:

1. Real line method;
2. Broken line method. Please select it based on the installation requirements.

There are two wiring diagrams for power cord:

1. Real line method;
2. Broken line method. Please select it based on the installation requirements.

(3) Selection of air switch and power cord:

Model	Power supply	Max Fuse Size/Fusible Max. (A)	Max Ckt, Bkr Size/Disjoncteur Max. (A)	Min. Circuit Ampacity (A)
V5BV-36WMAK	208/230V~ 60Hz	50	50	32
V5BV-48WMAK	208/230V~ 60Hz	60	60	37
V5BV-60WMAK	208/230V~ 60Hz	70	70	42

**NOTICE**

- (1) Selection of circuit breaker and power cord in the above table is based upon unit's maximum power (maximum current).
- (2) Specification of power cord is based on the working condition where ambient temperature is 40°C(104°F) and multi-core copper cable (working temperature is 90°C(194°F), e.g. power cable with YJV cross-linked copper, insulated PE and PVC sheath) is lying on the surface of slot. If working condition changes, please adjust the specification according to national standard.
- (3) Specification of circuit breaker is based on the working condition where ambient temperature of circuit breaker is 40°C(104°F). If working condition changes, please adjust the specification according to national standard.

## 5 Check Items after Installation and Test Operation

### 5.1 Check Items after Installation

Check items	Possible conditions due to improper installation	Check
Each part of the unit is installed securely?	Unit may fall, shake or emit noise.	
Gas leakage test is taken or not?	Insufficient cooling (heating) capacity	
Unit gets proper thermal insulation or not?	There may be condensation and dripping.	
Drainage is smooth or not?	There may be condensation and dripping.	
Is the voltage in accordance with the rated voltage specified on the nameplate?	Unit may malfunction or components may get damaged.	
Is the electric wiring and pipe connection installed correctly?	Unit may malfunction or components may get damaged.	
Unit is securely grounded or not?	Electrical short	
Power cord meets the required specification?	Unit may malfunction or components may get damaged.	
Is the air inlet/outlet blocked?	Insufficient cooling (heating) capacity	
Length of refrigerant pipe and the charging amount of refrigerant are recorded or not?	The refrigerant charging amount is not accurate.	
Metal pieces on compressor feet are removed or not?	Compressor may get damaged.	

### 5.2 Test operation and debugging

<b>NOTICE</b>
(1) After finishing the first installation or replacing the main board of outdoor unit, it is necessary to perform test operation and debugging. Otherwise, unit will not work.
(2) Test operation and debugging must be performed by professional technicians.

#### 5.2.1 Prepare the test operation and debugging

- (1) Do not connect power until all installation work is finished.
- (2) All control circuits and wires are correctly and securely connected.
- (3) Check whether the metal pieces on compressor feet are removed.
- (4) All small debris and tools, especially metal chips, thread ends and forceps holder, must be removed from the unit.
- (5) Check whether unit's appearance and pipeline system has been damaged during transportation.
- (6) Calculate the quantity of refrigerant that needs to be added according to the pipe length. Pre-charge the refrigerant. For details of adding refrigerant during test operation, see below.
- (7) After refrigerant is added, make sure valves of outdoor unit are completely open.
- (8) For the convenience of troubleshooting during debugging, unit shall be connected to a

PC with applicable debugging software. Make sure unit's real-time data can be checked through this computer. Information on the debugging software can be found in the *Service Manual*.

- (9) Before test operation, make sure unit is powered on and compressor has been preheated for more than 8 hours. Touch the unit to check whether it's normally preheated. If yes, start test operation. If compressor hasn't been preheated, it might be damaged by testing.

### 5.2.2 Test Operation and Debugging

Description of test operation procedures and main board display of ODU

Description of each stage of debugging progress							
—	Debugging code		Progress code		Status code		Code meaning and operation method
Progress	LED1		LED2		LED3		
	Code	Display status	Code	Display status	Code	Display status	
01_ Set master unit	db	On	01	On	AO	On	System is not debugged.
	db	On	01	On	OC	On	<b>Hold main board's SW7 button for 5s</b> to start debugging. Main board will display as shown to the left. 2s later, next step starts.
02_ Allocate addresses	db	On	02	On	Ad	Blink	System is assigning addresses. 10s later, display as below:
	db	On	02	On	L7	Blink	No master indoor unit. Display will be on for 1min, during which master IDU can be set manually. If not, system will automatically set the unit with minimum IP address as the master IDU.
	db	On	02	On	OC	On	Allocation is finished. 2s later, next step starts.
03_ Confirm the quantity of ODU	db	On	03	On	01	Blink	System is confirming. 1s later, next step starts.
	db	On	03	On	OC	On	System finishes confirmation. 2s later, next step starts.
04_ Confirm the quantity of IDU	db	On	04	On	01~80	Blink	LED3 displays the quantity of indoor units. Confirm the number manually. If the number is not correct, cut off power of IDU and ODU and check whether communication wire of IDU is correctly connected. After the check, reconnect power and start debugging from level 01. If the number is then correct, press main board's SW7 button to confirm. Then the display will move on to then next step:
	db	On	04	On	OC	On	System has confirmed the quantity. 2s later, next step starts.
05_ Detect ODU's internal communication and capacity ratio	db	On	05	On	C2	On	Communication between master ODU and driver has error. Check the communication connection of ODU's main board and drive board. When the error is eliminated, start next step. If power is off during troubleshooting, then restart debugging from step 01 after power is on.
	db	On	05	On	OC	On	Communication of master ODU and driver is normal. Unit will display as shown to the left for 2s and detect the capacity ratio of IDU and ODU. If the ratio is within range, than next step will start 2s later. If the ratio is out of range, unit will display as below:
	db	On	05	On	CH	On	Rated capacity ratio of IDU is too high. Change the combination of IDU and ODU to make the ratio

							within range. And restart debugging from step 01.
	db	On	05	On	CL	On	Rated capacity ratio of IDU is too low. Change the combination of IDU and ODU to make the ratio within range. And restart debugging from step 01.
06_ outdoor components	db	On	06	On	error code	On	Outdoor component's error. LED3 will display the related error code. <b>After errors are eliminated</b> , system will start next step automatically. If power is off during troubleshooting, then restart debugging from step 01 after power is on.
	db	On	06	On	OC	On	System detects no error on outdoor component. 10s later, next step starts.
07_ Detect indoor components	db	On	07	On	Error code	On	System detects error on indoor components. XXXX means the project code of IDU with error. 3s later, related error code will be shown. For instance, if no.1 IDU has d6 and d7 errors, then the LED3 digital tube will alternate between 00,01,d5,d6,07,92,d6,d7 every 2s. <b>After errors are eliminated</b> , system will start next step automatically. If power is off during troubleshooting, then restart debugging from step 01 after power is on.
	db	On	07	On	OC	On	No error on components of IDU. 2s later, next step starts.
08_ Confirm preheated compressor	db	On	08	On	UO	On	Preheat time for compressor is less than 8 hours. Display will be as shown on the left until the preheat time reaches 8 hours. <b>Press main board's SW7 button to confirm manually</b> that the preheat time has reached 8 hours. Then start next step. (Note: Compressor may get damaged if it is started without 8 hours of preheat time)
	db	On	08	On	OC	On	Compressor has been preheated for 8 hours. 2s later, next step starts.
09_ Refrigerant judgments before startup	db	On	09	On	U4	On	System lack of refrigerant and display will be as shown on the left. <b>Please cut off power of IDU and ODU and check if there is leakage on pipeline.</b> Solve the leakage problem and add refrigerant into the unit. Then connect power and restart debugging from step 01. (Note: Before re-charging refrigerant, unit must be power off to avoid starting step 10 automatically.)
	db	On	09	On	OC	On	Refrigerant is normal and unit will display as shown on the left for 2s. Then next step starts.
10_ Status judgments of outdoor valves before startup	db	On	10	On	ON	On	Valves of ODU are being inspected. Compressor will start operation for 2min or so and then stop. The opening and closing status of outdoor valves are as shown below:
	db	On	10	On	U6	On	Ready for units to start debugging. <b>Press main board's SW7 button</b> to confirm startup of debugging. 2s later, main board will display as shown below:
	db	On	10	On	OC	On	Valves status is normal. Unit will display as shown on the left for 2s and then start next step.
12_ Confirm debugging startup	db	On	12	On	AP	Blink	Ready for units to start debugging. <b>Press main board's SW7 button</b> to confirm startup of debugging. 2s later, main board will display as shown below:
	db	On	12	On	AE	On	Startup is confirmed. After displaying for 2s, system will choose "15_Cooling debugging" or "16_Heating debugging" according to ambient temperature. <b>If the project requests to add refrigerant but it is not completely charged before debugging, refrigerant can be added in this process through the L-VALVE.</b>

15_ Cooling debugging	db	On	15	On	AC	On	Debugging for cooling mode. If no malfunction occurs for 20min when compressor is running, then system will start step 17; If malfunction occurs, unit will display as shown below:
	db	On	15	On	Error code	On	Malfunction occurs when debugging for cooling mode. After all malfunctions are eliminated, system will start next step.
16_ Heating debugging	db	On	16	On	AH	On	Debugging for heating mode. If no malfunction occurs for 20min when compressor is running, then system will start step 17; If malfunction occurs, unit will display as shown below:
	db	On	16	On	Error code	On	Malfunction occurs when debugging for heating mode. After all malfunctions are eliminated, system will start next step.
17_ Debugging finished	00	On	AC/AH	On	OFF	On	The entire unit has finished debugging and under standby-by condition.

### 5.2.3 Appendix: Reference of normal operation parameters

No.	Debug item		Parameter name	Unit	Reference
1	System parameters	ODU parameters	Outdoor temperature	℃(°F)	—
2			Compressor discharge temp	℃(°F)	<ul style="list-style-type: none"> <li>When compressor starts, discharge temp in cool mode is within 70~105℃(158~221°F) and at least 10℃(18°F) higher than the high pressure saturation temp;</li> <li>As for temp in heat mode, it is within 65~90℃(149~194°F) and at least 10℃(18°F) higher than the high pressure saturation temp.</li> </ul>
3			Defrosting temp	℃(°F)	<ul style="list-style-type: none"> <li>In cool mode, defrosting temp is 4~10℃(7~18°F) lower than system's high pressure value;</li> <li>In heat mode, defrosting temp is about 2℃(4°F) different from system's low pressure value.</li> </ul>
4			System high pressure	℃(°F)	<ul style="list-style-type: none"> <li>In cool mode, the normal high pressure value is within 20℃~55℃(68~131°F). According to the change of ambient temp and system's operating capacity, the high pressure value will be 10℃~30℃(18~54°F) higher than ambient temp. The higher ambient temp is, the smaller temp difference is. If ambient temp is 25~35℃(77~95°F) in cool mode, system's high pressure value will be within 44~53℃(79~95°F).</li> <li>In heat mode, if ambient temp is above -5℃(23°F), system's high pressure value is within 40~52℃(72~93°F). If ambient temp is low and many IDUs are turned on, the high pressure will be lower.</li> </ul>
5			System low pressure	℃(°F)	<ul style="list-style-type: none"> <li>When ambient temp in cool mode is 25~35℃(77~95°F), the low pressure value is 0~8℃(32~46°F).</li> <li>When ambient temp in heat mode is above -5℃(23°F), the low pressure value is -15~8℃(5~46°F).</li> </ul>

6			Opening angle of thermal EXV	PLS	<ul style="list-style-type: none"> <li>●In cool mode, the thermal electronic expansion valve remains 480PLS.</li> <li>●In heat mode, the adjustable opening angle of EXV is 60~480PLS.</li> </ul>			
7			Compressor's operating freq	HZ	Changes from 10Hz~80Hz.			
8			Compressor's operating current	A	When compressor works normally, the current is no more than 18.4A.			
9			Compressor's IPM temp	°C(°F)	When ambient temp is below 35°C(95°F), IPM temp is lower than 80°C(176°F) and the highest temp won't be above 95°C(203°F).			
10			Fan motor's operating freq	HZ	Changes from 0~49Hz according to system's pressure.			
11		IDU parameters	IDU ambient temp	°C(°F)	—			
12			Indoor heat exchanger's inlet temp	°C(°F)	<ul style="list-style-type: none"> <li>●According to ambient temp, for a same IDU in cool mode, the inlet temp will be 1°C~7°C(2~13°F) lower than the outlet temp, and 4~9°C(7~16°F) higher than the low pressure value.</li> <li>●For a same IDU in heat mode, the inlet temp will be 10°C~20°C(18~36°F) lower than the outlet temp.</li> </ul>			
13						Opening angle of indoor EXV	PLS	<ul style="list-style-type: none"> <li>●In cool mode, the opening angle of indoor EXV varies within 70~480PLS.</li> <li>●In heat mode, the opening angle of indoor EXV varies within 70~480PLS.</li> </ul>
14								
15			Communication parameters	Communication data	—	Number of IDUs detected by software is the same with the actual number. No communication error.		
16	Drainage system	—	—	Indoor unit can drain water out completely and smoothly. Condensate pipe has no backward slope of water; Water of outdoor unit can be drained completely through drainage pipe. No water dripping from unit base.				
17	Others	—	—	Compressor and indoor/outdoor fan motor operate normally. Unit can operate normally.				



## 6 Common Malfunctions and Troubleshooting

<b>⚠WARNING</b>	
(1)	If there is a noticeable malfunction (e.g. unpleasant smell, or unusual noise), turn unit off and disconnect power immediately. Then contact qualified service center. If unit continues operation, it may get damaged and lead to electric shock or fire hazard.
(2)	Do not repair the air conditioner by yourself. Improper maintenance may lead electric shock or fire hazard.

●Please check the items below before calling for maintenance.

Problems	Causes	What to do
Unit doesn't work.	Fuse or circuit breaker is cut off.	Replace fuse or reset the circuit breaker.
	Power failure	Restart unit when power is restored.
	Power is not connected.	Connect the power.
	Remote controller's battery is dead	Replace new battery.
	Remote controller is out of the control range.	Control range is within 8m(26feet).
Unit runs but stops immediately.	Air inlet or air outlet of indoor and outdoor units is blocked.	Clear obstructions.
Unit not cooling or heating properly	Air inlet or air outlet of indoor and outdoor units is blocked.	Clear obstructions.
	Improper temp setting	Adjust setting at remote controller or wired controller
	Fan speed is set too low.	Adjust setting at remote controller or wired controller
	Air flow direction is not correct.	Adjust setting at remote controller or wired controller
	Door or window is open.	Close the door or window.
	Direct sunshine	Draw curtain or louver.
	Too many people in the room.	
	Too many heat sources in the room.	Reduce heat sources.
Filter is blocked or dirty.	Clean the filter	

**NOTICE!** If problem cannot be solved after checking the above items, please contact a qualified service center and describe the cases and models.

●Following circumstances are not malfunctions.

Malfunction		Reason
Unit doesn't run.	Unit starts up immediately after it is turned off.	Overload protection switch makes it run after a 3-min delay.
	Power is just turned on.	Standby operation lasts for about 1min.
Mist comes from the unit.	Under cooling	Indoor air with high humidity is cooled rapidly.
Noise is emitted.	Slight cracking sound is heard when unit is just turned on.	It is the noise when electronic expansion valve is initialized.
	There is repeating sound when cooling.	It is the sound for gas refrigerant flowing in the unit.
	There is sound when unit starts or stops.	It is the sound when gas refrigerant stops flowing.
	There is slight and repeating sound when unit is running or after running.	This is the sound of drainage operation.
	Cracking sound is heard when unit is running or after running.	This is the sound caused by the expansion of panel and other parts of the unit due to temperature change.
Unit blows out dust.	Unit starts up after not operating for a long time.	Dust in indoor unit is blown out.
Unit emits odor.	Under operation	Unit absorbs the room odor and then blows it out.

## 7 Error Indication

Inquiry method of error indication: combine division symbol and content symbol to check the corresponding error.

For example, division symbol L and content symbol 4 (L4) means over-current protection.

Division symbol \ Content symbol		Content symbol					
		0	1	2	3	4	5
Indoor	L	Malfunction of IDU (uniform)	Protection of indoor fan	Auxiliary heating protection	Water-full protection	Over-current protection	Freeze prevention protection
	d		Indoor PCB is poor		Malfunction of ambient temperature sensor	Malfunction of entry-tube temperature sensor	Malfunction of middle temperature sensor
Outdoor	E	Malfunction of ODU (uniform)	High-pressure protection	Discharge low-temperature protection	Low-pressure protection	High discharge temperature protection of compressor	
	F	Main board of ODU is poor	Malfunction of high-pressure sensor		Malfunction of low-pressure sensor		Malfunction of discharge temperature sensor of compressor 1
	J		Over-current protection of compressor 1				
	b		Malfunction of outdoor ambient temperature sensor	Malfunction of defrosting temperature sensor 1		Malfunction of liquid temperature sensor of sub-cooler	Malfunction of gas temperature sensor of sub-cooler
	P	Malfunction of driving board of compressor (uniform)	Driving board of compressor operates abnormally (uniform)	Voltage protection of driving board power of compressor (uniform)	Reset protection of driving module of compressor	Drive PFC protection of compressor	Over-current protection of inverter compressor
Debugging	U	Preheat time of compressor is insufficient		Wrong setting of ODU's capacity code/jumper cap			Wrong address for driving board of compressor
	C	Communication malfunction between IDU, ODU and IDU's wired controller		Communication malfunction between main control and inverter compressor driver		Malfunction of lack of IDU	Alarm because project code of IDU is inconsistent

## DC Inverter Multi VRF System

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Content symbol Division symbol		0	1	2	3	4	5
		Status	A	Unit waiting for debugging	Inquiry of compressor operation parameters		Defrosting
n	SE operation setting of system		Setting of defrosting cycle K1	Setting of upper limit of IDU/ODU capacity distribution ratio			

Content symbol Division symbol		6	7	8	9	A	H
Indoor	L	Mode shock	No main IDU	Power supply is insufficient	1-to-more: number of IDU is inconsistent	1-to-more: IDU series is inconsistent	Alarm due to bad air quality (Fresh air unit)
	d	Malfunction of exit-tube temperature sensor	Malfunction of humidity sensor		Malfunction of jumper cap	Web address of IDU is abnormal	PCB of wired controller is abnormal
	J		Gas-mixing protection of 4-way valve	High pressure ratio protection of system		Protection due to abnormal pressure	
	b	Malfunction of inlet temp sensor of gas-liquid separator	Malfunction of outlet temp sensor of gas-liquid separator		Malfunction of heat exchanger temperature sensor		Clock of system is abnormal
	P	Drive IPM module protection of compressor	Malfunction of drive temperature sensor of compressor	Drive IPM high temperature protection of compressor	Desynchronizing protection of inverter compressor		High-voltage protection of compressor's drive DC bus bar
Debugging	U	Alarm because valve is abnormal		Short-circuit malfunction of IDU	Malfunction of pipe-line for ODU		
	C						Rated capacity is too high
Status	A	Heat pump function setting	Quiet mode setting	Vacuum pump mode	IPLV test	EU AA level EER test mode	Heating
	n	Malfunction inquiry of unit	Parameter inquiry of unit	Engineering No. inquiry of indoor unit		Heat pump unit	Heating only unit

Content symbol		C	L	E	F	J	P
Division symbol							
Indoor	L	Models for IDU and ODU are not matched					
	d	Abnormal setting for capacity button	Malfunction of air-outlet temperature sensor(Fresh air unit)	Malfunction of indoor CO <sub>2</sub> sensor (fresh air unit)			
	E	Drop protection of discharge temperature sensor of compressor 1					
	F						Malfunction of DC motor
	J		High-pressure protection				
	P	Drive current detection circuit malfunction of compressor	Low-voltage protection of compressor's drive DC bus bar	Phase-lacking of inverter compressor	Drive charging circuit malfunction of compressor	Failure startup of inverter compressor	AC current protection of inverter compressor
	H	Drive current detection circuit malfunction of fan	Low-voltage protection of fan's drive DC bus bar	Phase-lacking of inverter fan	Drive charging circuit malfunction of fan	Failure startup of inverter fan	AC current protection of inverter fan
Debugging	U	Setting of main IDU is successful	Wrong button-dial	Charging of refrigerant is invalid			
	C	Malfunction of lack of main control unit	Rated capacity is too low		Malfunction of multiple main control units	Malfunction of multiple main wired controllers	Malfunction of multiple main wired controllers
Status	A	Cooling	Charging refrigerant automatically	Charging refrigerant manually	Fan	Alarm for cleaning filter	Debugging confirmation for startup of unit
	n	Cooling only unit		Negative sign code	Fan model		

Content symbol		U	b	d	n	y
Division symbol						
Debugging	C	Communication malfunction between IDU and the receiving lamp plate	Overflow distribution of IP address			
Status	A	Long-distance emergency stop	Emergency stop of operation	Limit operation		

## 8 Function Setting of Outdoor Unit

When debugging is finished, press SW3 on the master unit and unit will be ready for function setting. Default display of outdoor unit's main board is as shown below:

LED1		LED2		LED3	
Function code	Display	Current progress	Display	Current status	Display
A7	Blink	00	Blink	00	Blink

Then press SW1 button(▲) and SW2 button(▼) on the master unit to switch function codes of LED1 to select relevant functions.

Function setting includes: outdoor silent mode setting (A7), heating and cooling function setting (A6), compulsory defrosting (n3)

After selecting relevant functions, press SW7 to confirm and start setting this function. Main board of outdoor unit will display as shown below:

LED1		LED2		LED3	
Function code	Display	Current progress	Display	Current status	Display
A7	On	00	Blink	oC	Blink
A6	On	CH	Blink	CH	Blink
n3	On	35	Blink	oC	Blink

### 8.1 ODU Quiet Function

This function is suitable for applications that have strict requirements for noise. It includes two modes: smart night silent mode, compulsory silent mode.

When unit enters function setting, main board of outdoor unit will display as shown below:

LED1		LED2		LED3	
Function code	Display	Current progress	Display	Current status	Display
A7	On	00	Blink	oC	Blink

Press SW1 button (▲) and SW2 button (▼) to select the following silent modes.

LED1	LED2		LED3	
Function code	Silent mode	Display	Current status	Display
A7	00~12	Blink	oC	Blink

When applicable mode is selected, press SW7 to confirm. Main board of outdoor unit will display as below:

LED1	LED2		LED3	
Function code	Silent mode	Display	Current status	Display
A7	00~12	On	oC	On

Notice: code 00 of LED2 refers to normal mode. Codes 01~09 refer to smart night silent mode. Codes 10~12 refer to compulsory silent mode. When setting is finished, master unit will memorize it so that it can't be cancelled even when power is on or off.

Then press SW6 on the master unit to return to the previous step. (If this button is pressed when function is being set, system will return to the previous step. If SW6 is pressed when setting is finished, system will resume displaying the current operation status.)

If selection is made for 5min, unit will exit and resume displaying the current status.

## 8.2 Cool & Heat Function

This function can set operation modes and prevent mode conflict that is caused by different settings for different indoor units. It is especially suitable for hotels and other small business areas.

There are 3 levels for this setting:

Level A—Mode Lock Control

Upon entering this function setting, main board of outdoor unit will display as shown below:

LED1		LED2		LED3	
Function code		Current progress	Display	Current status	Display
A6		nC	Blink	nC	Blink

Press SW1 button (▲) and SW2 button (▼) to select the following functions:

LED1		LED2		LED3	
Function code	Display	Current progress/mode	Display	Current status	Display
A6	On	nC	Blink	nC	Blink
A6	On	nH	Blink	nH	Blink
A6	On	nA	Blink	nA	Blink
A6	On	nF	Blink	nF	Blink

When applicable mode is selected, press SW7 to confirm. The related display is as shown below:

LED1		LED2		LED3	
Function code	Display	Current progress/mode	Display	Current status	Display
A6	On	nC	On	nC	On
A6	On	nH	On	nH	On
A6	On	nA	On	nA	On
A6	On	nF	On	nF	On

This setting will be memorized by master unit and can't be cancelled even when power is on or off.

Then press SW6 on the master unit to return to the previous step.

If no selection is made for 5min, unit will exit and resume displaying the current status.

(If this button is pressed when function is being set, system will return to the previous step. If SW6 is pressed when setting is finished, system will resume displaying the current operation status.)

Default setting is "nA" cooling and heating type.

Level B—IDU Mode Auto Control

When Level A is disabled or outdoor unit is set to be cooling and heating type, the operation mode within one system depends on the master-slave setting of indoor units.

## 8.3 Forced Defrosting

This function can only be set when outdoor compressor is running.

Upon entering this function, main board of outdoor unit will display as shown below:

LED1		LED2		LED3	
Function code	Display	Current progress/mode	Display	Current status	Display
n3	On	00	Blink	00	Blink



Press SW7 to confirm. When system enters this function, main board of outdoor unit will display as shown below:

LED1		LED2		LED3	
Function code	Display	Current progress/mode	Display	Current status	Display
n3	On	00	On	00	On

Then unit will be in compulsory defrosting mode. Once unit is under compulsory defrosting, this mode can only be stopped when requirements for exit are met.

### 8.4 Restore Factory Defaults

- (1) If you want to restore factory defaults, hold SW8 button on the main board of ODU for more than 10s, then all LEDs will blink for 3s. Main board will cancel all setting, including the IP addresses and project codes of IDU and ODU. The display for finished debugging is “0”.
- (2) If you want to restore factory defaults and don’t need project debugging, then hold SW3 and SW8 on the main board of ODU for more than 10s, then all LEDs will blink for 5s. All settings are cleared out, including the IP addresses and project codes of IDU and ODU. The display for finished debugging remains the same.
- (3) When you only want to restore the default functions, hold SW5 and SW8 button for more than 10s, then all LED will blink for 7s. All function settings are cleared out, but IDU and ODU’s project codes and the display for finished debugging remain the same.

### 8.5 Static Pressure Function

If ODU’s installation area is not convenient for releasing air and users do not have strict requirements for ODU noise, this function can be set to satisfy the heat exchange of ODU.

Before power on, set codes of SA6 of main board. The relevant static pressure is:

Code setting SA6		Static pressure (Pa)
DIP1	DIP2	
0	0	0
1	0	20

Note: code of number side is “1”; default code of SA6 is “00”.

## 9 Maintenance and Care

Regular check, maintenance and care can extend unit's service life. Please have a dedicated person in charge of the management of air conditioners.

### 9.1 Outdoor Heat Exchanger

Outdoor heat exchanger shall be cleaned regularly, which is at least once every two months. You can use a dust catcher with nylon brush to clean away the dust on the heat exchanger. If compressed air source is available, it also can be used to clean the heat exchanger. Do not clean it with water.

### 9.2 Drain Pipe

Please check regularly whether drain pipe is blocked. Make sure condensate can be drained out smoothly.

### 9.3 Notice before Seasonal Use

- (1) Check whether air inlets and air outlets of indoor and outdoor units are blocked;
- (2) Check whether ground connection is reliable;
- (3) Check whether batteries in the remote controller need replacing;
- (4) Check whether air filter is properly installed;
- (5) If unit has had power off for a long period of time, it should be power on 8 hours before operation starts so as to preheat the outdoor compressor;
- (6) Check whether outdoor unit is securely installed. If there is any problem, please contact an authorized service technician.

### 9.4 Maintenance after Seasonal Use

- (1) Disconnect power of the entire system;
- (2) Clean the air filter and outer case of indoor and outdoor units;
- (3) Clean away the dust and debris on indoor and outdoor units;
- (4) If outdoor unit has rust, please apply some paint to it so as to prevent the rust from growing.

### 9.5 Parts Replacement

Parts and components can be obtained from authorized distributor.

#### **▲WARNING**

When you are conducting air tightness test and leakage test, do not mix oxygen, C<sub>2</sub>H<sub>2</sub> or other dangerous gas into the refrigerant circuit. Use nitrogen or refrigerant to conduct the tests.

## 10 After-sales Service

If there's quality defect or other problems in the product, please contact your authorized distributor for help.

Warranty must be based on the following conditions:

- (1) Product's initial startup must be performed by professional technicians.
- (2) Only approved spare parts are used,
- (3) All instructions of unit operation and maintenance in this manual must be strictly followed according to set period and set frequency.
- (4) Any breach of the above conditions will void the warranty.

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