NORTEK GLOBAL HVAC, LLC

DC Inverter VRF Units

Owner's Manual

Heat Recovery

V5BV-R72WMBK

V5BV-R96WMBK

V5BV-R120WMBK

- 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.

WARNING	WARNING NOTICE: Failure to comply with warning notice could result in property damage, serious personal injury or death
CAUTION	CAUTION NOTICE: Failure to comply with caution notice could result in property damage or personal injury
NOTICE	NOTICE: Failure to comply with notice could result in property damage

WARNING
(1) Instructions for installation and use of this product are provided by the manufacturer.
(2) Installation must be performed by authorized personnel only.
(3) For safety operation, please strictly follow the instructions in this manual.
(4) During operation, the gross rated capacity of working IDUs should be within the gross rated capacity of ODU. Otherwise, IDU's cooling/heating performance will be reduced.
(5) This manual must be kept for future reference.
(6) In case of malfunction or operation failure, please examine the following items and contact a qualified service technician as soon as possible. 1) Nameplate (model, cooling capacity, product code ship date). 2) Malfunction status (detail description of conditions before and after malfunction occured)
(7) All units have been strictly tested and proved to be qualified before shipment. To avoid unit damage or even operation failure which may be caused by improper service, please do not disassemble units by yourself.
(8) 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 without prior notice.
(9) If the supply cord is damaged, it must be replaced an appropriate size cord.

Children should not be allowed to play on or near this equipment.

DISPOSAL: Do not dispose this product as unsorted household waste. Recycle according to local ordinances.

Contents

1 Safety Precautions

⚠ WARNING
(1) Follow this instruction to complete the installation work. Please read this manual carefully before unit startup and service.
(2) Wire size of power cord should be sufficient to handle voltage. The damaged power cord and connection wire should be replaced by appropriate size cable.
(3) After connecting the power cord, please secure the electric box cover properly in order to avoid accident.
(4) Never fail to comply with the nitrogen charge requirements. Charge with nitrogen when welding pipes.
(5) Never short-circuit or bypass the pressure switch.
(6) used Connect wired controller before turning power on to the unit or controller could be damaged.
(7) Before using the unit, please check if the piping and wiring are correct to avoid water leakage, refrigerant leakage, electric shock, or fire etc..
(8) Do not insert fingers or objects into air outlet/inlet grille.
(9) Allow for adequate ventilation during installation, especially when installing gas/oil heating equipment..
(10) Never start up or shut off the air conditioner by means of directly plugging or unplugging the power cord.
(11) Turn off the unit after it runs at least five minutes; otherwise it will adversely affect oil return of the compressor.
(12) Do not allow children operate this unit.
(13) Do not operate this unit with wet hands.
(14) Turn off the unit or cut off the power supply before cleaning, otherwise electric shock or injury may occur.
(15) Never spray or flush water towards unit, otherwise malfunction or electric shock may occur.
(16) Do not expose the unit to the wet or corrosive circumstances.
(17) Under cooling mode, please don't set the room temperature too low and keep the temperature difference between indoor and outdoor unit within 5°C(9°F).
(18) User is not allowed to repair the unit. Faulty service may cause electric shock or fire. Please contact a qualified technician for help.
(19) Before installation, please check if the power supply matches the requirements specified on the nameplate..
(20) Installation should be conducted by qualified personnel. Please do not attempt to install the unit by yourself. Improper handling may result in water leakage, electric shock or fire etc..
(21) Be sure to use the appropriate accessories and parts to prevent the water leakage, electric shock and fire.
(22) Make sure the unit can be grounded properly and securely to avoid electric shock. Please do not connect the ground wire to gas pipe, water pipe, lightning rod or telephone line.

(23) Turn power on to the unit 8 hours before startup. Do not disconnect the power when you want to stop the unit for a short period of time, i.e. overnight
(24) If refrigerant leakage occurs during installation, please ventilate immediately. Toxic gas will result if the refrigerant gas meets spark or fire.
(25) When cleaning the unit, please be aware that volatile liquid, such as paint thinner or gasoline will damage the unit appearance. Only use soft cloth with a little mild detergent to clean the outer casing of unit.
(26) If you notice anything unusual (such as burning smell), please cut off the main power supply, and immediately contact a qualified service technician. Failure to disconnect power could damage the unit and lead to electric shock or fire.

Manufacture will not assume responsibility of personal injury or equipment damage caused by improper installation and commission, unnecessary service inability of following instructions listed in this manual.

2 Product Introduction

This Multi VRF Modular System adopts inverter compressor technology. The stepless capacity modulation allows for an operating range of 10%-100%. Several indoor air handler models are available with operation range from 72K Btu to 360K. These can be widely used in working area and are especially applicable in places with variable load requirements..

2.1 Names of Main Parts

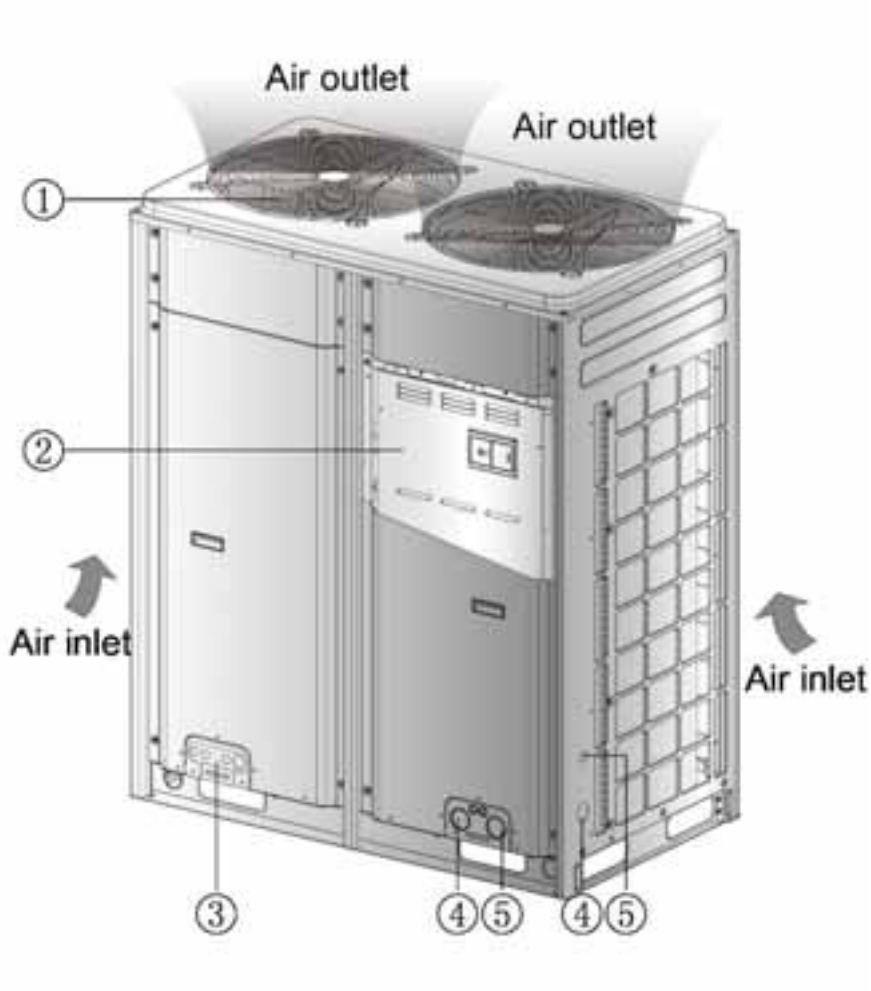


Fig.1

NO.	①	②	③	④	⑤
Name	Fan, Motor	Electric Box Assembly	Valve interface	Power cord through-hole	Communication code through-hole

2.2 Combinations of Outdoor Units

Cooling Capacity MBH / kW	144 / 44.8	168 / 50.4	192 / 55.9
Combine Models	V5BV-R72WMBK+ V5BV-R72WMBK	V5BV-R72WMBK+ V5BV-R96WMBK	V5BV-R96WMBK+ V5BV-R96WMBK

Cooling Capacity MBH / kW	216 / 61.5	240 / 67	264 / 78.4
Combine Models	V5BV-R96WMBK+ V5BV-R120WMBK	V5BV-R120WMBK+ V5BV-R120WMBK	V5BV-R72WMBK+ V5BV-R96WMBK+ V5BV-R96WMBK

Cooling Capacity MBH / kW	288 / 84	312 / 89.5	336 / 95
Combine Models	V5BV-R96WMBK+ V5BV-R96WMBK+ V5BV-R96WMBK	V5BV-R96WMBK+ V5BV-R96WMBK+ V5BV-R120WMBK	V5BV-R96WMBK+ V5BV-R120WMBK+ V5BV-R120WMBK

Cooling Capacity MBH / kW	360 / 100.5
Combine Models	V5BV-R120WMBK+ V5BV-R120WMBK+ V5BV-R120WMBK

2.3 Combinations of Indoor and Outdoor Units

Cooling Capacity MBH / kW	Max number of connectable IDU (unit)	Cooling Capacity MBH / kW	Max number of connectable IDU (unit)
72 / 22.4	12	240 / 67	41
96 / 28	16	264 / 78.4	45
120 / 33.5	20	288 / 84	49
144 / 44.8	25	312 / 89.5	53
168 / 50.4	29	336 / 95	58
192 / 55.9	33	360 / 100.5	61
216 / 61.5	37		

The total capacity of indoor units should be within 50%~135% of that of outdoor units.

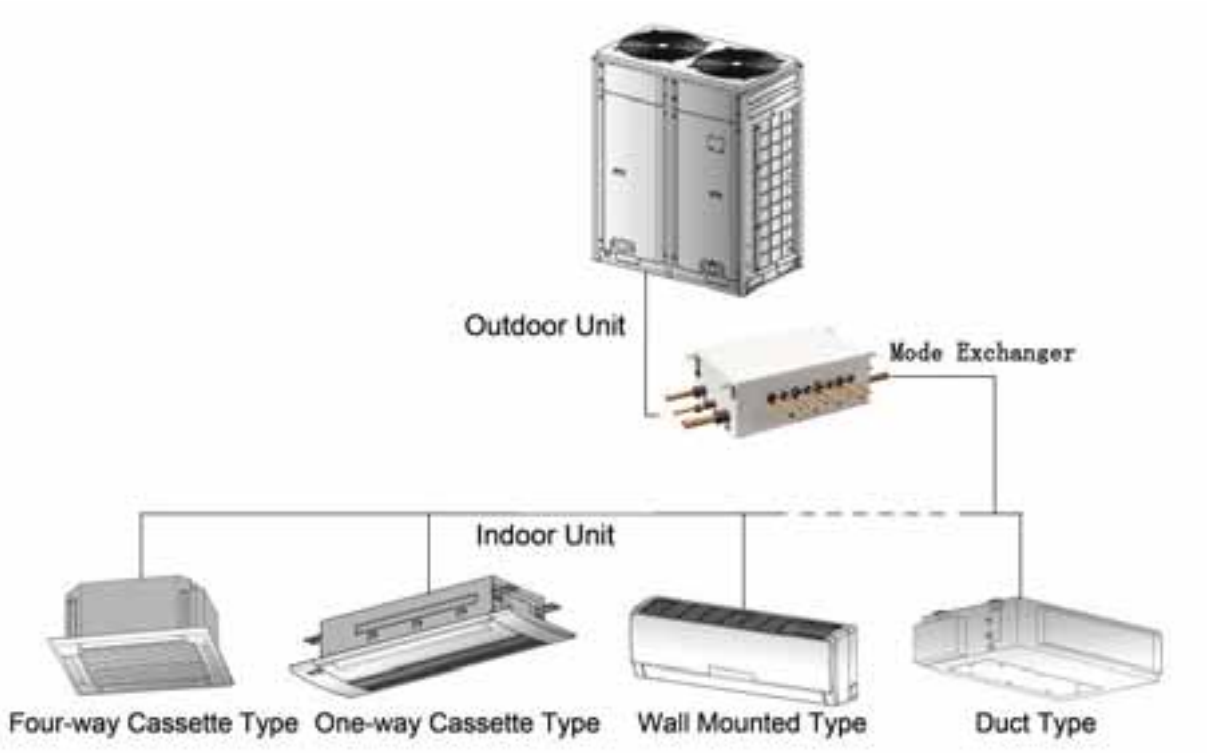


Fig.2

Fig.2 illustrates the combination of the ODU of Modular DC Inverter Multi VRF System and the IDU of Multi VRF System. IDU can be cassette type, one-way cassette type, wall-mounted type, duct type, etc. When any one IDU receives operation signal, ODU will start to work according to the capacity; when all IDUs stop, ODU will also stop.

2.4 The Range of Production Working Temperature

Cooling operation	Ambient temperature: -5° C(23° F)~50° C(122° F)
Heating operation	Ambient temperature: -20° C(-4° F)~24° C(75.2° F)

NOTICE! **Operation outside of Temperature Range may damage this product and will invalidate the warranty.**

3 Preparation before Installation

Note: The graphic is only used for reference. Your product may look differently.

Unit: mm(inch).

3.1 Standard Parts

Please use the following standard parts supplied by manufacturer.

Parts for Outdoor Unit				
Number	Name	Picture	Quantity	Remarks
1	Owner's Manual		1	
2	Wiring (match with resistance)		1	Must be connected to the last IDU of communication connection

3.2 Installation Site

WARNING
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
Never expose the unit to direct sunlight and rainfall. Installation should also be free from dirt as much as possible.
Try to keep the unit away from combustible, inflammable and corrosive or exhaust gas.
Leave sufficient space for servicing the equipment.
Place the indoor and outdoor units as close as possible to each other to minimize the pipe length and bends.
Children are not allowed to play on or near equipment.

3.2.1 When the outdoor unit is totally surrounded by walls, please refer to following figures for clearance dimension.

3.2.1.1 Clearance dimension for single-module unit

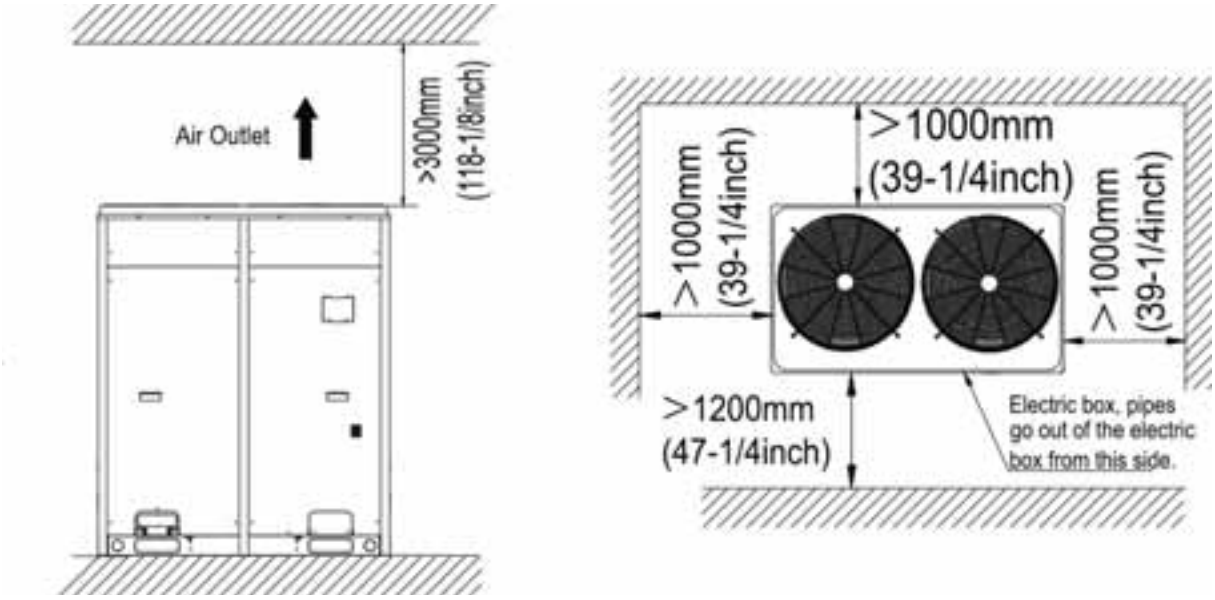


Fig.3

3.2.1.2 Space dimension for dual-module unit

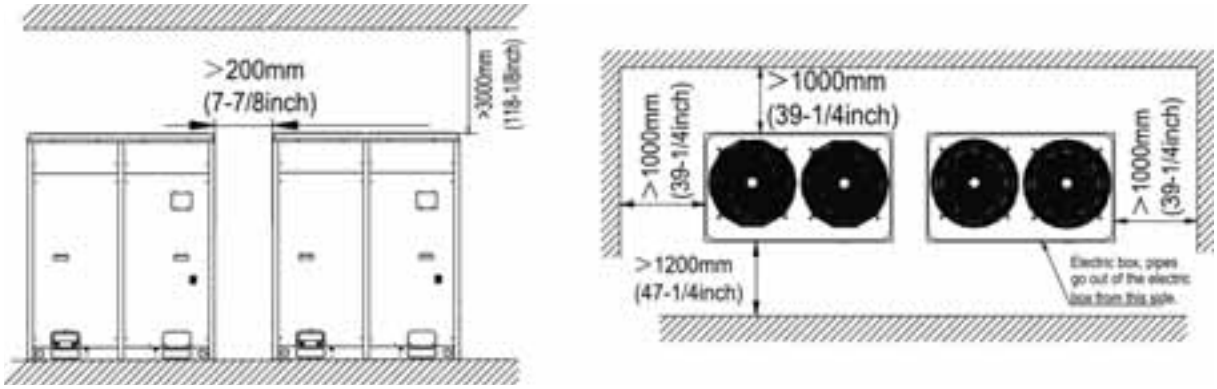


Fig.4

3.2.1.3 Clearance dimension for three-module unit

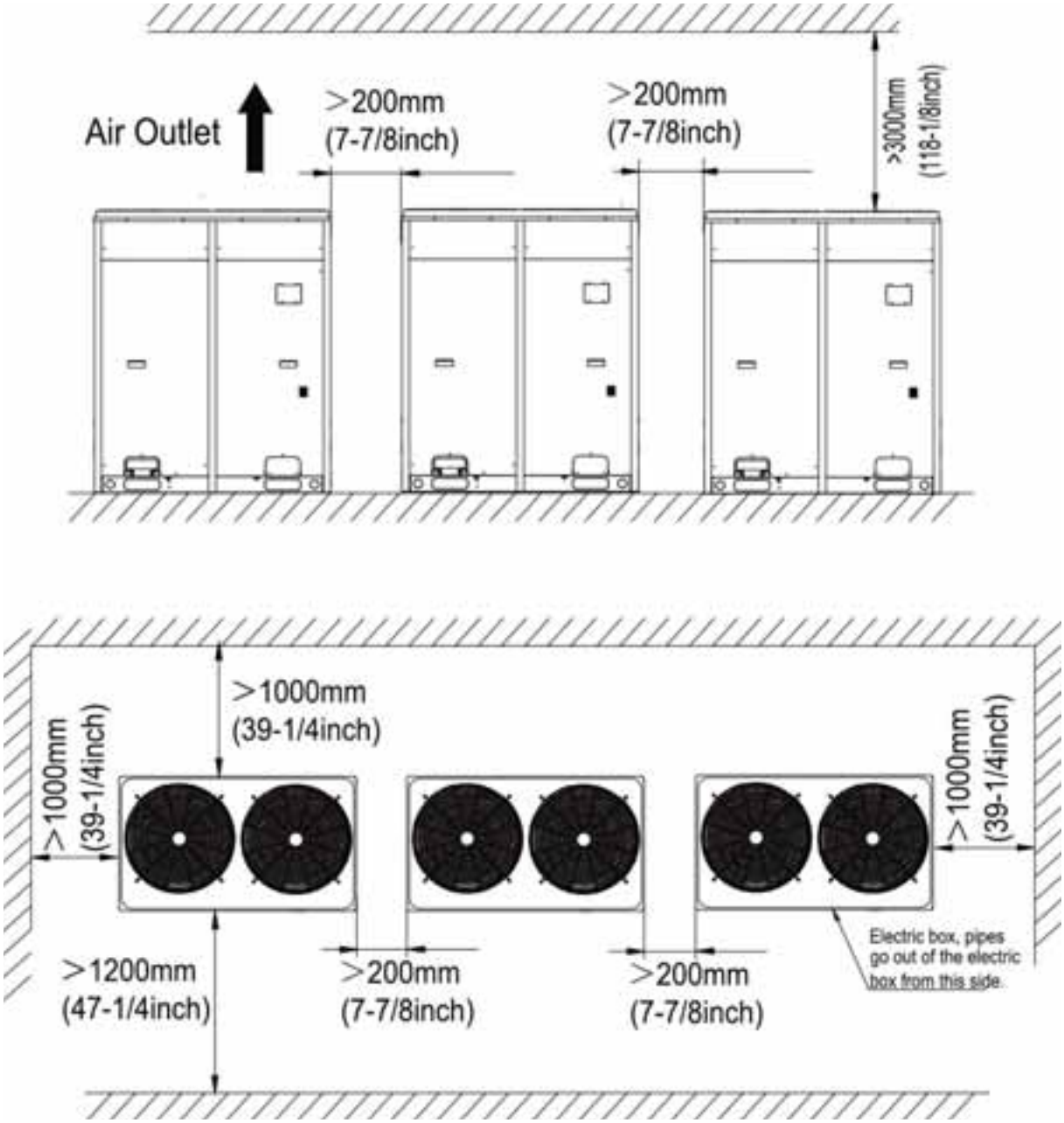


Fig.5

3.2.2 When there is wall (or similar obstruction) above the unit, keep the distance between the unit top and the wall at least 3000mm (10 feet). When the unit is located in a totally open space with no obstructions in four directions, keep the distance between the unit top and wall at least 1500mm (5 feet) or above (See Fig.6). When space is limited within 1500mm (5 feet) or the unit is not set in an open space, air return duct is required to be installed for ventilation (See Fig.7).

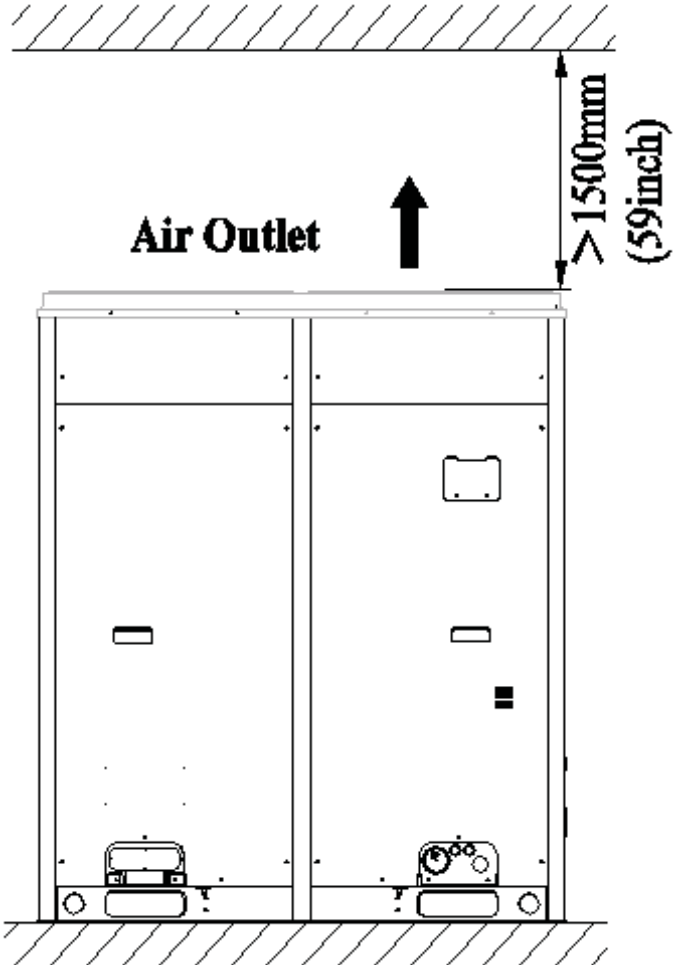

Air Outlet
>1500mm
(59inch)

Fig.6

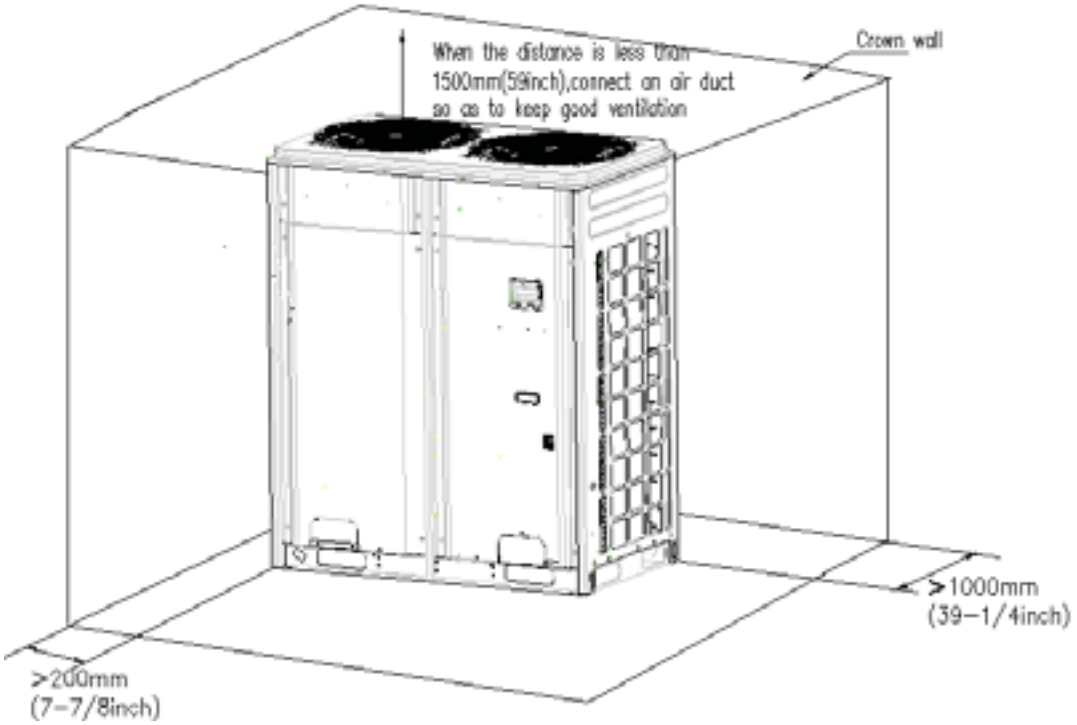

When the distance is less than
1500mm(59inch),connect an air duct
so as to keep good ventilation
Crown wall
>1000mm
(39-1/4inch)
>200mm
(7-7/8inch)

Fig.7

3.2.3 Space dimension for multiple-module unit

For good ventilation, make sure there are no obstructions above the units.

When the units are located at a half-open space (front and left/right side is open), install the unit as per these or opposite direction.

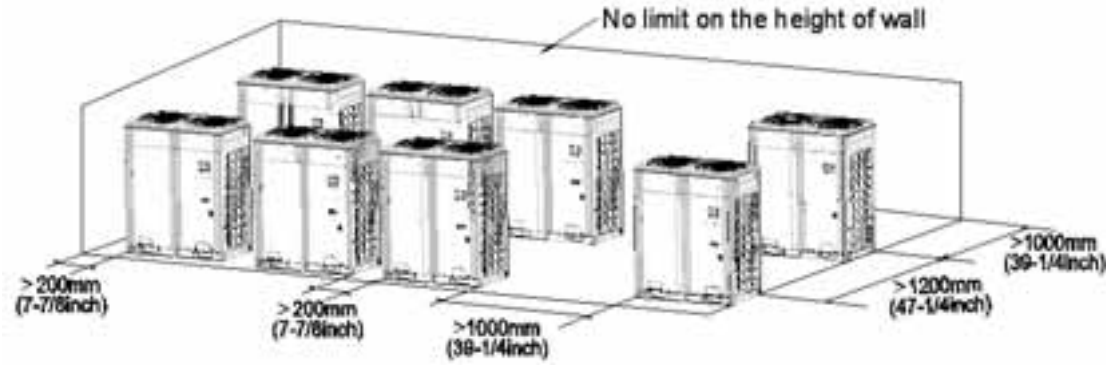


Fig.8

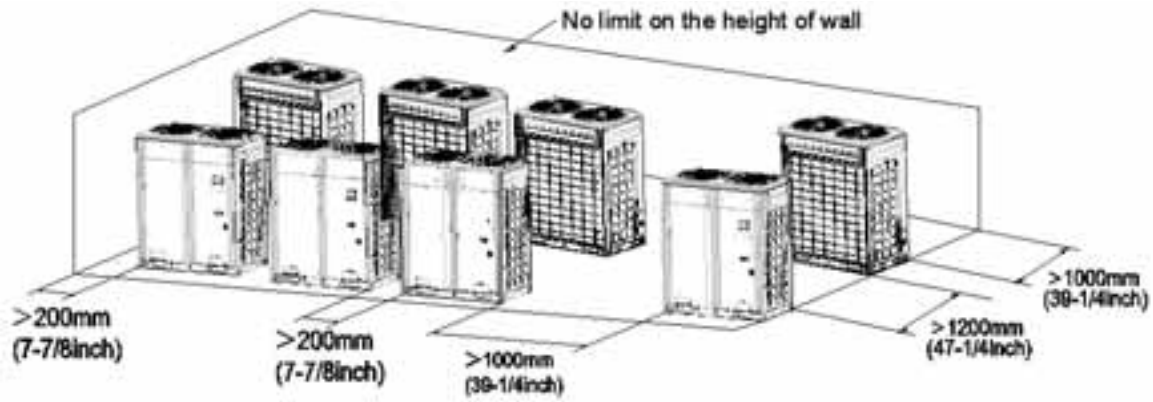


Fig.9

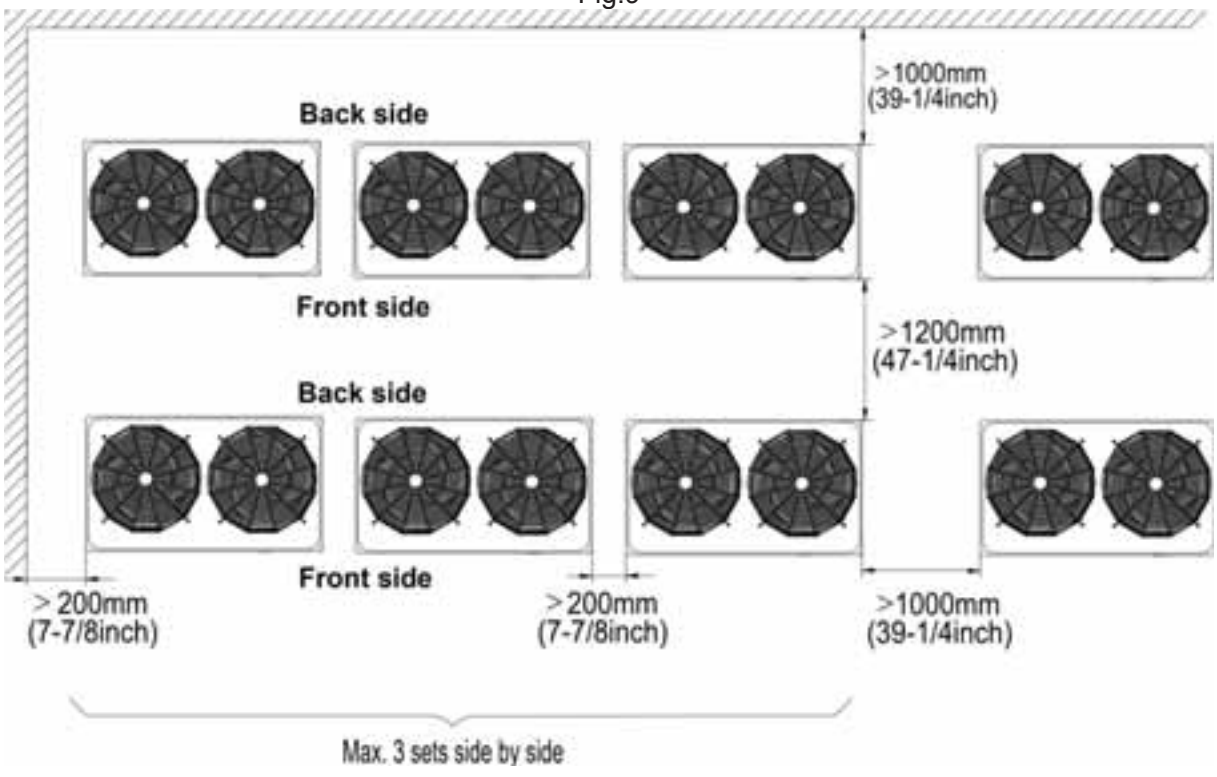


Fig.10

3.2.4 Consider seasonal wind direction when installing the outdoor unit

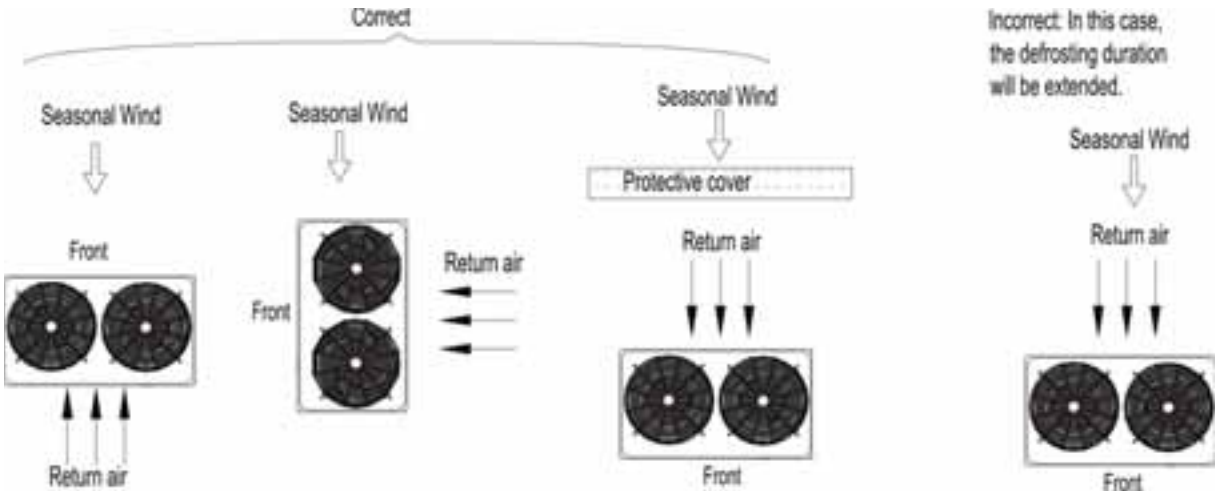


Fig.11

3.2.5 Consider snowfall when installing the outdoor unit

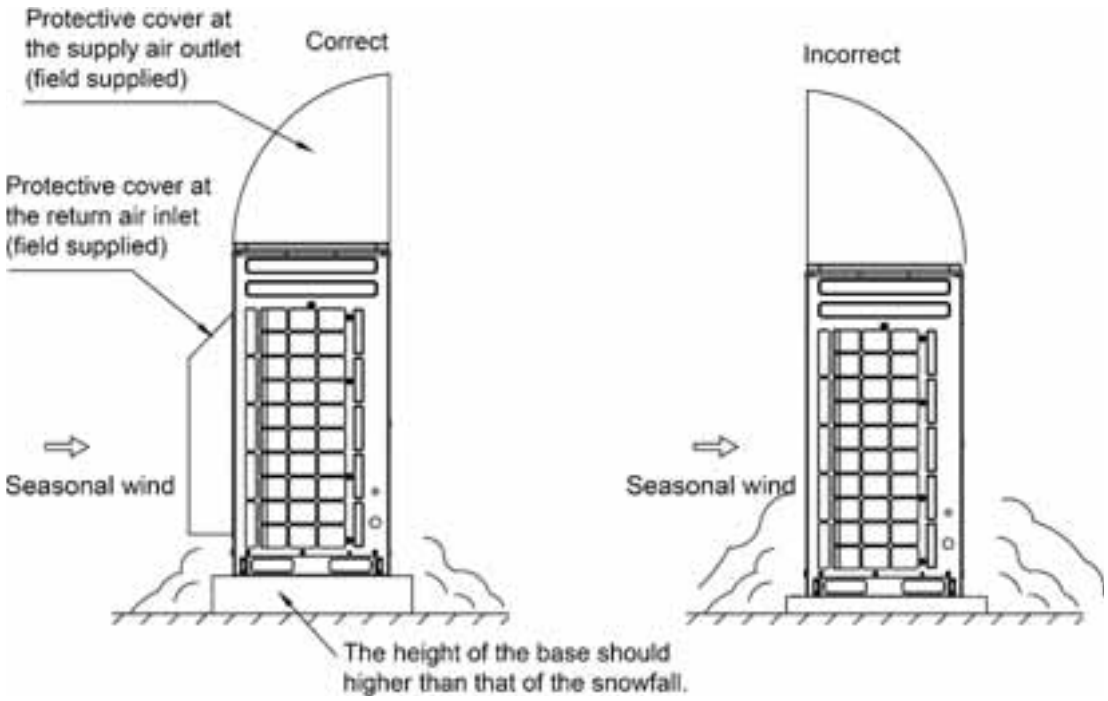


Fig.12

3.3 Piping Work Requirements

Refer to the table below for piping work requirements.

R410A Refrigeratn System		
Outer diameter (mm/inch)	Wall thickness mm(inch)	Type
Φ6.35(1/4)	≥0.8(1/32)	0
Φ9.52(3/8)	≥0.8(1/32)	0
Φ12.70(1/2)	≥0.8(1/32)	0
Φ15.9(5/8)	≥1.0(1/32)	0
Φ19.05(3/4)	≥1.0(1/32)	0
Φ22.2(7/8)	≥1.2(1/16)	1/2H
Φ25.40(1/1)	≥1.2(1/16)	1/2H
Φ28.60(9/8)	≥1.2(1/16)	1/2H
Φ31.80(5/4)	≥1.3(1/16)	1/2H
Φ34.90(11/8)	≥1.3(1/16)	1/2H
Φ38.10(12/8)	≥1.5(1/16)	1/2H
Φ41.30(13/8)	≥1.5(1/16)	1/2H
Φ44.5(7/4)	≥1.5(1/16)	1/2H
Φ51.4(7/4)	≥1.5(1/16)	1/2H
Φ54.1(17/8)	≥1.5(1/16)	1/2H

4 Installation Instruction

4.1 Physical Dimension of the Outdoor Unit and Mounting Hole

Outline and Physical Dimension of V5BV-R72WMBK, V5BV-R96WMBK,and V5BV-R120WMBK unit.

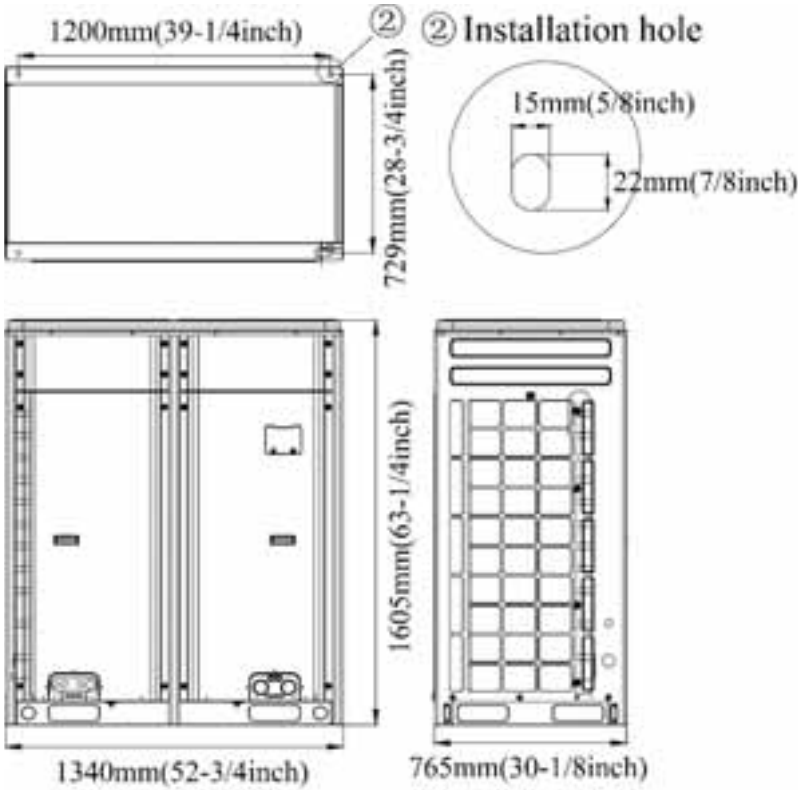


Fig.13

4.2 Connection Pipe

4.2.1 Schematic Diagram of Piping Connection

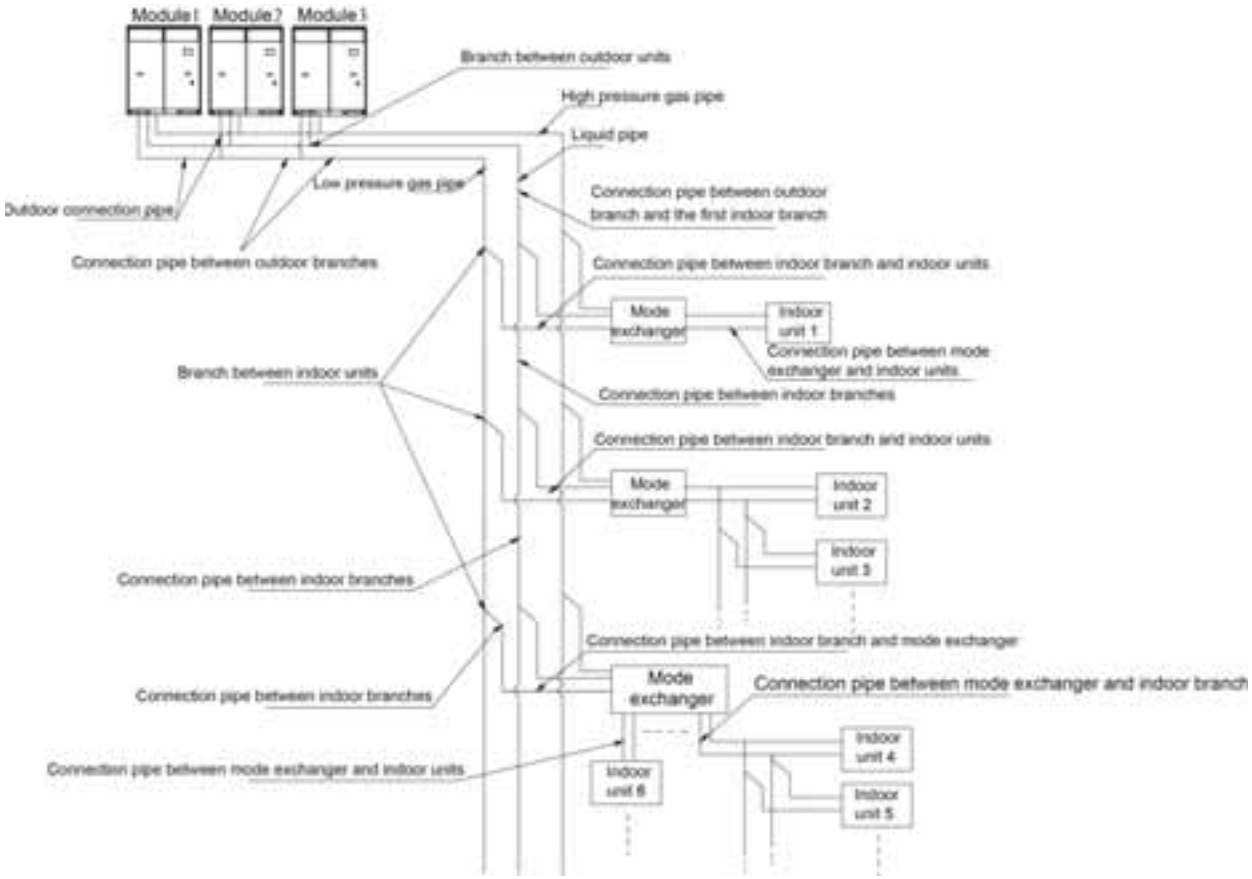


Fig.14

4.2.2 Schematic Diagram of Piping Sequence

V5BV-R72WMBK, V5BV-R96WMBK, and V5BV-R120WMBK

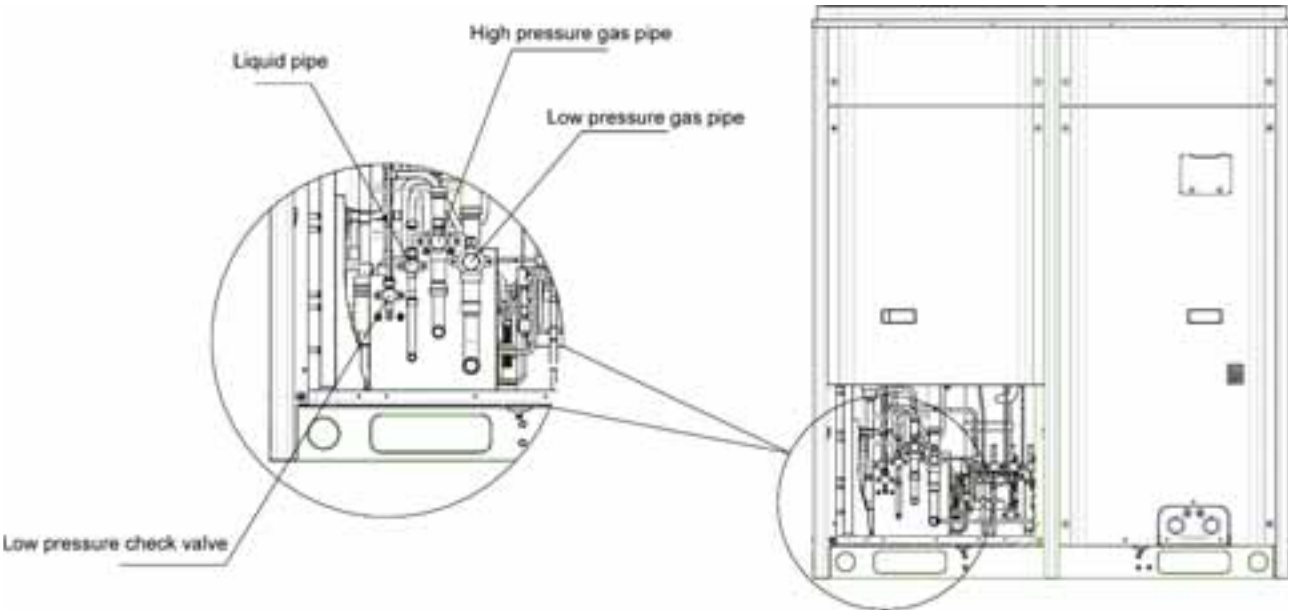


Fig.1

4.2.3 Allowable pipe length and drop height between indoor and outdoor units

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

Note: Equivalent length of one Y-type manifold is about 0.5m (1-3/4feet).

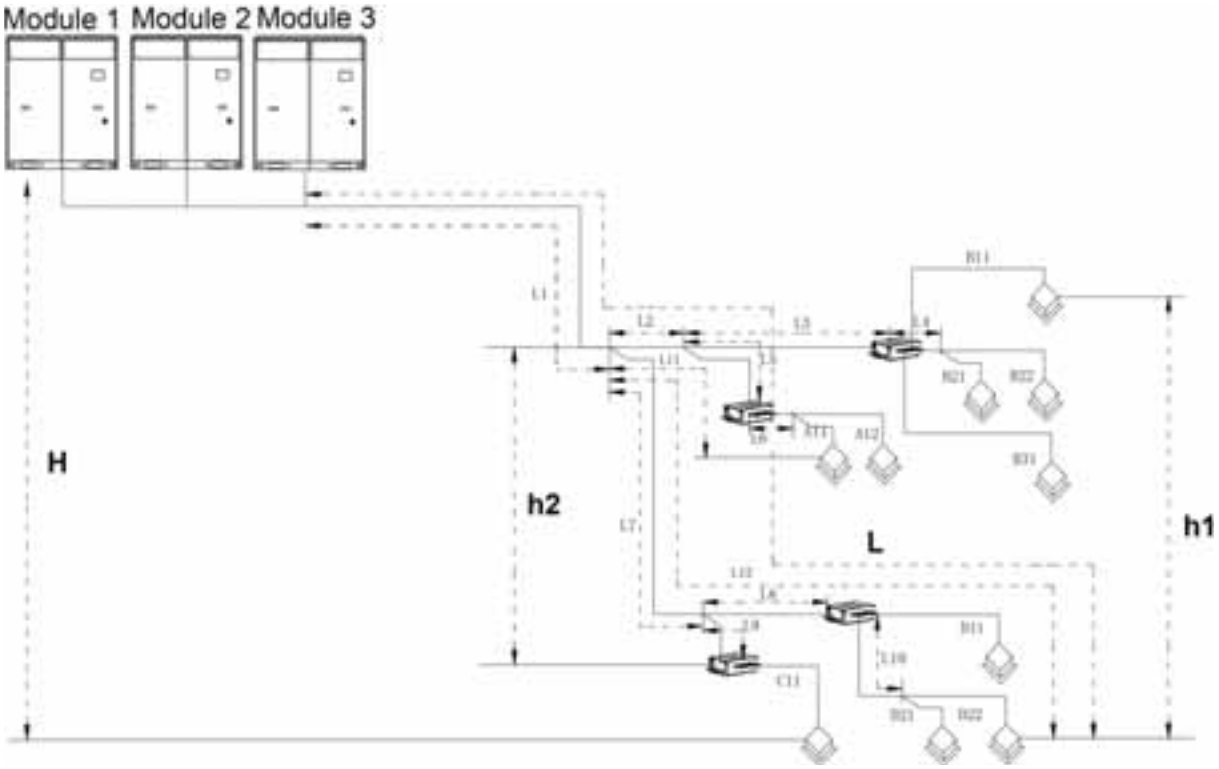


Fig.16

L10: Length from the first branch to the farthest IDU;

L11: Length from the first branch to the nearest IDU;

Equivalent length of branch of IDU is 0.5m (1-3/4feet).

R410A Refrigerant System		Allowable Value m(feet)	Fitting Pipe
Total length (actual length) of fitting pipe		≤1000(3280)	L1+L2+L3+L4+…+L9+a+b+…+i+j
Length of farthest fitting pipe m(feet)	Actual length	≤165(541)	L1+L6+L7+L8+L9+j
	Equivalent length	≤190(623)	
Difference between the pipe length from the first branch of IDU to the farthest IDU and the pipe length from the first branch of IDU to the nearest IDU		≤40(131)	L10-L11
Equivalent length from the first branch to the furthest piping (1)		≤40(131)	L6+L7+L8+L9+j
Height difference between outdoor unit and indoor unit	Outdoor unit at upper(2)	≤90(295)	——
	Outdoor unit at lower(2)	≤90(295)	——
Height difference between indoor units		≤30(98)	——
Maximum length of Main pipe(3)		≤90(295)	L1
From IDU to its nearest branch (4)		≤10(32)	a,b,c,d,e,f,g,h,i,j

Notices:

(1) Normally, the pipe length from the first branch of IDU to the farthest IDU is 40m (131 feet). Under the following conditions, the length can reach 90m (295 feet).

1) Actual length of pipe in total: L1+L2x2+L3x2+L4x2+…+L9x2+a+b+…+i+j≤1000m (3280 feet).

2) Length between each IDU and its nearest branch a, b, c, d, e, f, g, h, i, j≤40m (131 4feet).

3) Difference between the pipe length from the first branch of IDU to the farthest IDU and the pipe length from the first branch of IDU to the nearest IDU: L10-L11≤40m (131 feet).

(2) When the outdoor unit is at upper side and height difference is more than 50m (164 feet), please consult factory agent for the related technical requirement.

(3) When the maximum length of the main pipe from ODU to the first branch of IDU is≥90m (295 feet), then adjust the pipe size of the gas pipe and liquid pipe of main pipe according to the following table.

Cooling Capacity MBH / kW	Size of connection between outdoor unit and the first indoor branch		
	Low pressure gas pipe mm(inch)	Liquid pipe mm(inch)	High pressure gas pipe mm(inch)
72 / 22.4	Φ19.05(3/4)	Φ9.52(3/8)	Φ15.9(5/8)
96 / 28	Φ22.2(7/8)	Φ9.52(3/8)	Φ19.05(3/4)
120 / 33.5	Φ28.6(1-1/8)	Φ15.9(5/8)	Φ22.2(7/8)
144/ 44.8	Φ31.8(1-1/8)	Φ15.9(5/8)	Φ25.4(1)
168 / 50.4	Φ34.9(1-3/8)	Φ19.05(3/4)	Φ25.4(1)
192 / 55.9	Φ34.9(1-3/8)	Φ19.05(3/4)	Φ25.4(1)
216 / 61.5	Φ34.9(1-3/8)	Φ19.05(3/4)	Φ28.6(1-1/8)
240 / 67	Φ38.1(1-1/2)	Φ22.2(7/8)	Φ31.8(1-1/2)
264 / 78.4	Φ38.1(1-1/2)	Φ22.2(7/8)	Φ31.8(1-1/2)
288 / 84	Φ38.1(1-1/2)	Φ22.2(7/8)	Φ31.8(1-1/2)
312 / 89.5	Φ38.1(1-1/2)	Φ22.2(7/8)	Φ31.8(1-1/2)
336 / 95	Φ41.3(1-5/8)	Φ22.2(7/8)	Φ34.9(1-3/8)
360 / 100.5	Φ44.5(1-3/4)	Φ22.2(7/8)	Φ34.9(1-3/8)

(4) If the length between an IDU and its nearest branch is above 10m (33 feet), then double the size of the liquid pipe of IDU (only for the pipe size that is≤6.35mm (1/4inch).

4.2.4 Connection Pipe among Outdoor Modules

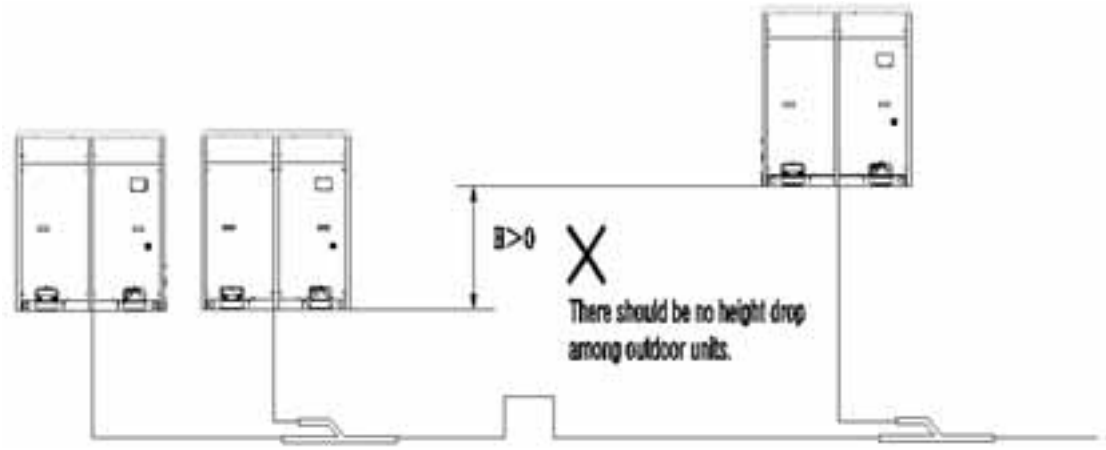


Fig.17

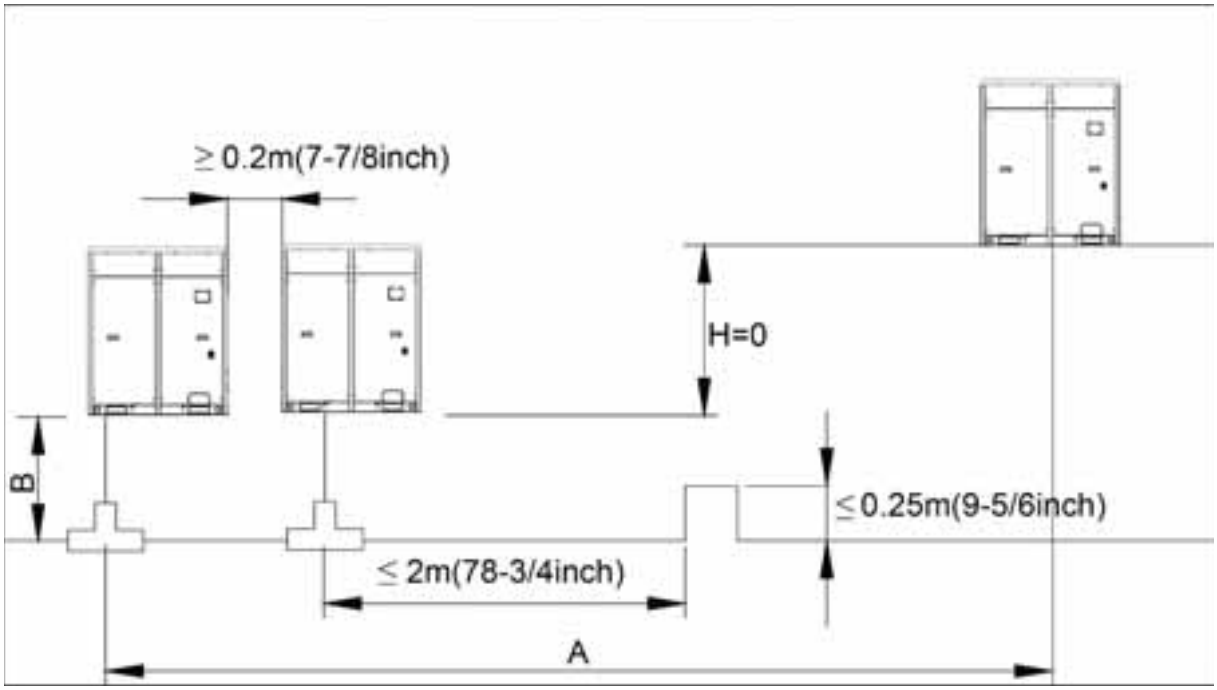


Fig.18

Note: When the distance between outdoor units exceeds 2m (6-1/2 feet), U-type oil trap should be added at low-pressure gas pipe. A+B≤10m (33 feet).

4.2.5 Size requirement for branch pipe and piping (main pipe)

4.2.5.1 Connection sketch map of single-module system

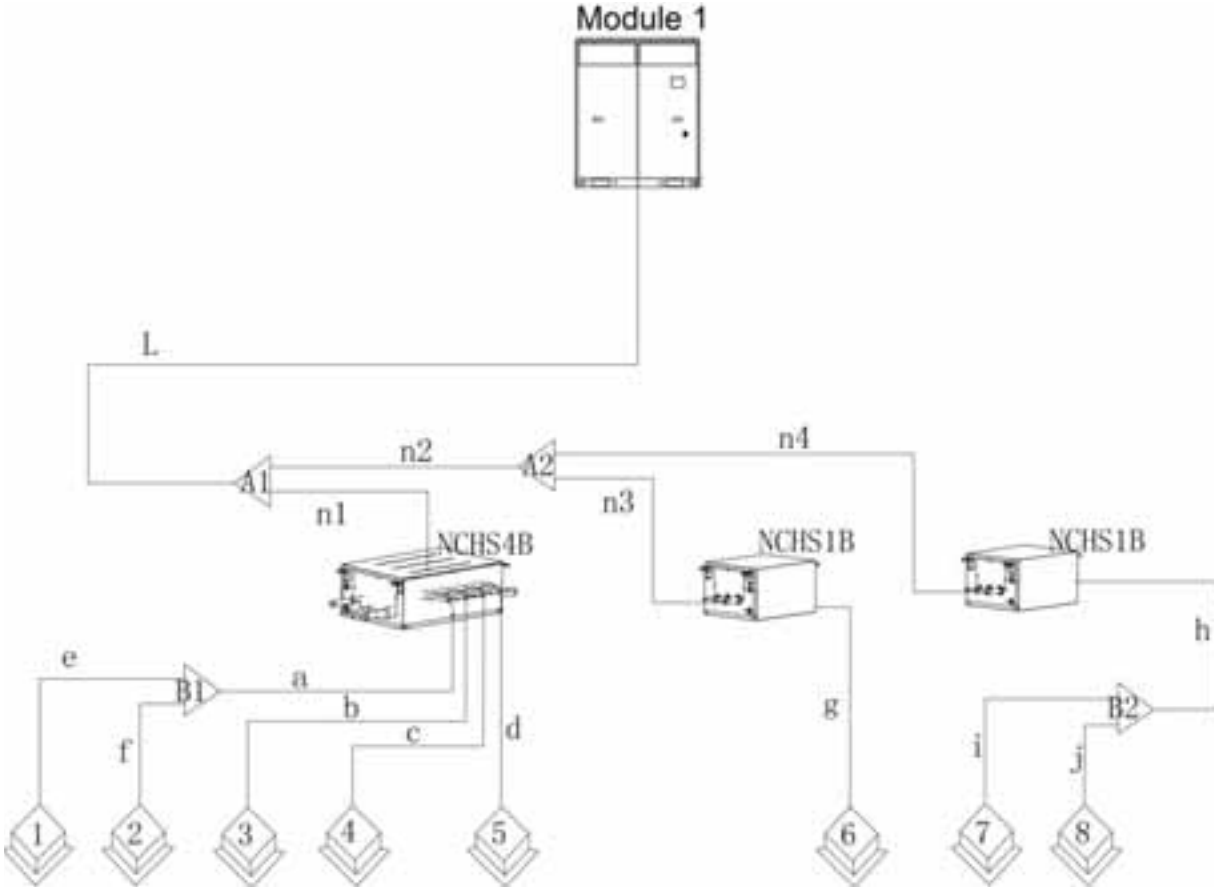


Fig.19

4.2.5.2 Connection sketch map of multi-module system

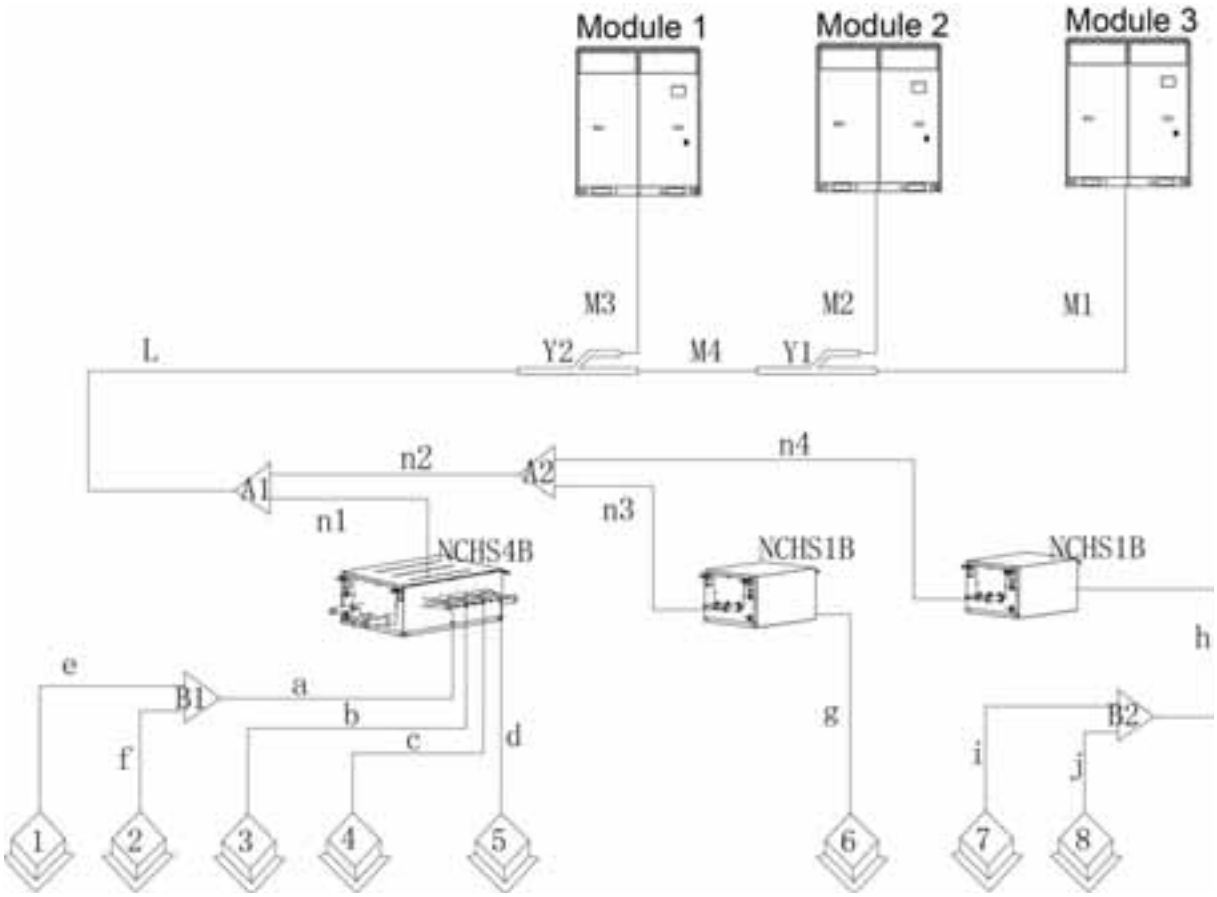


Fig.20

4.2.5.3 Select appropriate pipe between outdoor unit and the first indoor branch (“L”) as per the pipe size of outdoor unit. Pipe size of basic outdoor module is shown as follows:

Basic module	Pipe between outdoor unit and the first indoor branch		
	Low pressure gas pipe mm(inch)	Liquid pipe mm(inch)	High pressure gas pipe mm(inch)
V5BV-R72WMBK	Φ19.05(3/4)	Φ9.52(3/8)	Φ15.9(5/8)
V5BV-R96WMBK	Φ22.2(7/8)	Φ9.52(3/8)	Φ19.05(3/4)
V5BV-R120WMBK	Φ28.6(1-1/8)	Φ12.7(1/2)	Φ22.2(7/8)

4.2.5.4 For multi-module system, select appropriate branch (”M1、M2、M3”) connected to outdoor module as per the pipe size of basic outdoor module. Pipe size of basic outdoor module is shown as follows:

Basic module	Size of the pipe between module and outdoor branch		
	Low pressure gas pipe mm(inch)	Liquid pipe mm(inch)	High pressure gas pipe mm(inch)
V5BV-R72WMBK	Φ19.05(3/4)	Φ9.52(3/8)	Φ15.9(5/8)
V5BV-R96WMBK	Φ22.2(7/8)	Φ9.52(3/8)	Φ19.05(3/4)
V5BV-R120WMBK	Φ28.6(1-1/8)	Φ12.7(1/2)	Φ22.2(7/8)

Selection of branch **"Y1、Y2"**of outdoor modules:

	Module's capacity (C)	Model
Selection of branch of outdoor modules	144≤C	ML01R

4.2.5.5 Size of connection pipe "M4" between branches of each basic module

Size of connection pipe between branches of each basic module is determined by the total rated capacity of upstream modules.

Total capacity of upstream modules Q(Btu/h)	Pipe size between manifolds		
	Low pressure gas pipe mm(inch)	Liquid Pipe mm(inch)	High pressure gas pipe (mm)
76000≥Q	Φ19.05(3/4)	Φ9.52(3/8)	Φ15.9(5/8)
96000≥Q＞76000	Φ22.2(7/8)	Φ9.52(3/8)	Φ19.05(3/4)
153000≥Q＞96000	Φ28.6(1-1/8)	Φ12.7(1/2)	Φ19.05(3/4)
232000≥Q＞153000	Φ28.6(1-1/8)	Φ15.9(5/8)	Φ22.2(7/8)
327000≥Q＞232000	Φ31.8(1-1/4)	Φ19.05(3/4)	Φ25.4(1)
461000≥Q＞327000	Φ38.1(1-1/2)	Φ19.05(3/4)	Φ28.6(1-1/8)
Q＞461000	Φ44.5(1-3/4)	Φ22.2(7/8)	Φ31.8(1-1/2)

4.2.5.6 Size of connection pipe "L" between the terminal outdoor branch and the first indoor branch

Connection pipe "L" between outdoor unit and the first indoor branch

Basic modules	Size of connection between outdoor unit and the first indoor branch		
	Low pressure gas pipe mm(inch)	Liquid pipe mm(inch)	High pressure gas pipe mm(inch)
V5BV-R72WMBK	Φ19.05(3/4)	Φ9.52(3/8)	Φ15.9(5/8)
V5BV-R96WMBK	Φ22.2(7/8)	Φ9.52(3/8)	Φ19.05(3/4)
V5BV-R120WMBK	Φ25.4(1)	Φ12.7(1/2)	Φ19.05(3/4)
V5BV-R72WMBK + V5BV-R72WMBK	Φ28.6(1-1/8)	Φ12.7(1/2)	Φ22.2(7/8)
V5BV-R72WMBK + V5BV-R96WMBK	Φ28.6(1-1/8)	Φ15.9(5/8)	Φ25.4(1)
V5BV-R96WMBK + V5BV-R96WMBK	Φ28.6(1-1/8)	Φ15.9(5/8)	Φ25.4(1)
V5BV-R96WMBK + V5BV-R120WMBK	Φ28.6(1-1/8)	Φ15.9(5/8)	Φ25.4(1)
V5BV-R120WMBK + V5BV-R120WMBK	Φ31.8(1-1/4)	Φ19.05(3/4)	Φ28.6(1-1/8)
V5BV-R72WMBK + V5BV-R96WMBK + V5BV-R96WMBK	Φ31.8(1-1/4)	Φ19.05(3/4)	Φ28.6(1-1/8)
V5BV-R96WMBK + V5BV-R96WMBK + V5BV-R96WMBK	Φ31.8(1-1/4)	Φ19.05(3/4)	Φ28.6(1-1/8)

V5BV-R96WMBK + V5BV-R96WMBK + V5BV-R120WMBK	Φ31.8(1-1/4)	Φ19.05(3/4)	Φ28.6(1-1/8)
V5BV-R96WMBK + V5BV-R120WMBK + V5BV-R120WMBK	Φ31.8(1-1/4)	Φ19.05(3/4)	Φ28.6(1-1/8)
V5BV-R120WMBK + V5BV-R120WMBK + V5BV-R120WMBK	Φ38.1(1-1/2)	Φ19.05(3/4)	Φ31.8(1-1/4)

4.2.5.7 Branch selection of mode exchanger (“A1, A2)

Select branch of mode exchanger as per total capacity of downstream indoor unit(s). Please refer to the following table.

R410A refrigerant system	Total Capacity of the Downstream Indoor Unit X(Btu/h)	Model
Y-Type Branch Pipe	X≤19100	FQ01Na/A
	19100＜X≤75000	FQ02Na/A
	75000＜X≤102360	FQ03Na/A
	102360＜X≤232000	FQ04Na/A
	232000＜X≤327500	FQ05Na/A
	327500＜X≤460620	FQ06Na/A
	460620＜X	FQ07Na/A

4.2.5.8 Piping size among upstream branches of heat pump mode exchanger (”n1、n2、n3、n4”)

Total rated capacity of downstream indoor units: X(Btu/h)	Size of connection pipe between branches of mode exchanger		
	Low pressure gas pipe mm(inch)	Liquid pipe mm(inch)	High pressure gas pipe mm(inch)
X≤48500	Φ19.05(3/4)	Φ9.52(3/8)	Φ15.9(5/8)
48500＜X≤136500	Φ28.6(1-1/8)	Φ12.7(1/2)	Φ22.2(7/8)
136500＜X≤272960	Φ28.6(1-1/8)	Φ15.9(5/8)	Φ22.2(7/8)
272960＜X≤327552	Φ31.8(1-1/4)	Φ19.05(3/4)	Φ28.6(1-1/8)
327552＜X≤460620	Φ38.1(1-1/2)	Φ19.05(3/4)	Φ31.8(1-1/4)
460620＜X	Φ44.5(1-3/4)	Φ22.2(7/8)	Φ38.1(1-1/2)

4.2.5.9 Piping size among downstream branches of heat pump mode exchanger ”a、h”

Total rated capacity of downstream indoor units: X ((Btu/h)	Size of piping between indoor branches	
	Gas pipe mm(inch)	Liquid pipe mm(inch)
X≤19100	Φ12.7(1/2)	Φ6.35(1/4)
19100＜X≤48450	Φ15.9(5/8)	Φ9.52(3/8)
48450＜X≤68200	Φ19.05(3/4)	Φ9.52(3/8)

4.2.5.10 Branch selection of downstream indoor unit of mode exchanger (”B1、B2”)

R410A refrigerant system	Total rated capacity of downstream indoor units: X(Btu/h)	Model
Y-type branch	X≤68200	FQ01A/A

4.2.5.11 Piping size between mode exchanger and downstream indoor unit (" b、c、d、g")

Total rated capacity of downstream indoor units: X (Btu/h)	Piping size between indoor branches	
	Gas pipe mm(inch)	Liquid pipe mm(inch)
X≤19100	Φ12.7(1/2)	Φ6.35(1/4)
19100＜X≤48450	Φ15.9(5/8)	Φ9.52(3/8)
48450＜X≤68200	Φ19.05(3/4)	Φ9.52(3/8)

4.2.5.12 Piping between indoor branch and indoor unit ("e、f、i、j")

Size of connection pipe between indoor branch and indoor unit should be consistent with the connection pipe of indoor unit.

Rated capacity of indoor units: X ((Btu/h)	Size of connection pipe between indoor branch and indoor unit	
	Gas pipe mm(inch)	Liquid pipe mm(inch)
X≤9554	Φ9.52(3/8)	Φ6.35(1/4)
9554＜X≤17060	Φ12.7(1/2)	Φ6.35(1/4)
17060＜X≤47700	Φ15.9(5/8)	Φ9.52(3/8)
47700＜X≤54600	Φ19.05(3/4)	Φ9.52(3/8)

4.3 Installation of the Connection Pipe

4.3.1 Precautions when installing the connection pipe

(1) Adhere to the following principles during piping connection: Connection pipeline should be as short as possible. The height difference between indoor and outdoor units should be as short as possible. Keep number of bends as few as possible. The radius of curvature should be as large as possible.

(2) Weld the connection pipes between indoor and outdoor unit. Please strictly follow the requirements for welding process. Rosin joints and pin holes are not allowed.

(3) When laying the pipes, be careful not to distort them. The radius of bending parts should be more than 200mm (8 inches). The pipes cannot be repeatedly bent or stretched, otherwise the material will become brittle. Do not bend or stretch a section of pipe over three times.

(4) Please use a torque wrench to connect union nut on the indoor unit. See Fig. 21.

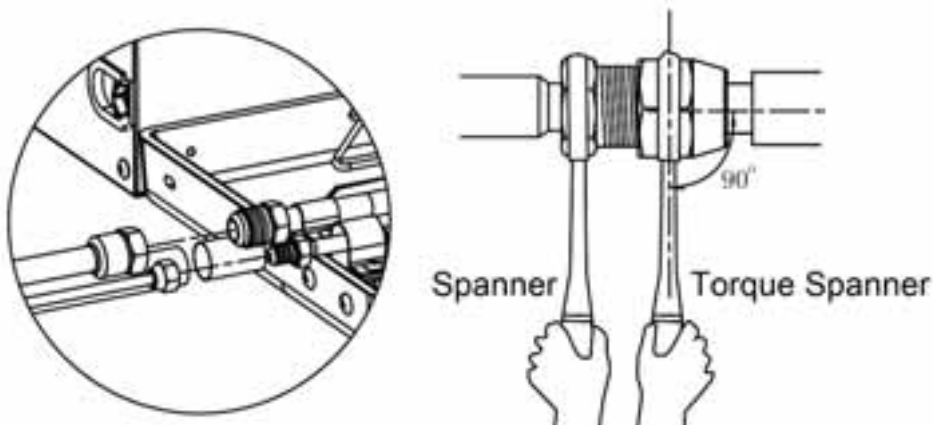


Fig.21

1) Align the expansion end of copper pipe with the center of threaded joint. Tighten the flare nuts by hand.
2) Tighten the flare nuts with torque wrench until you hear "click" sound.
3) Use sponge to wrap the connecting pipe and joints without thermal insulation and secure it with plastic tape.
4) A mounting support for the connection pipe is required.
5) The curvature degree of connection pipe be as large as possible, otherwise the pipe might crack. Installation personnel should use tube bender when bending the pipe.
6) Don't forcibly stretch or pull on the pipe joint, otherwise indoor capillary or other pipes might be damaged and lead to refrigerant leakage.

4.3.2 Y-type manifold

(1) Y-type manifold

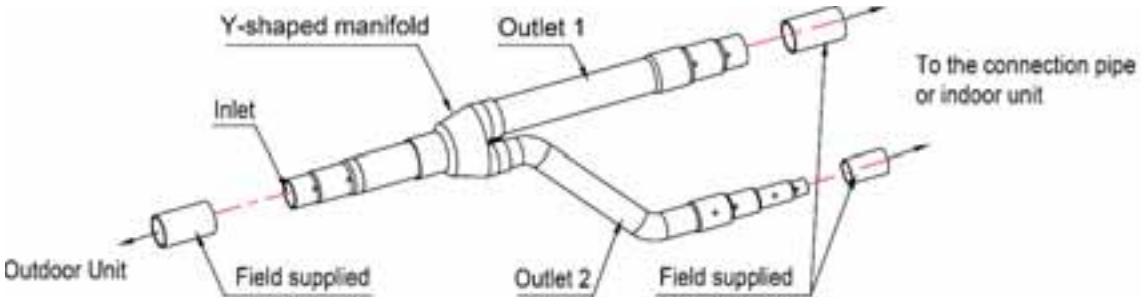


Fig.22

(2) Y-type manifold has several pipe sections with different pipe sizes, which matches various copper pipe sizes. Use pipe cutter to cut in the middle of the pipe section with proper pipe size and deburr it. See Fig.23.

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

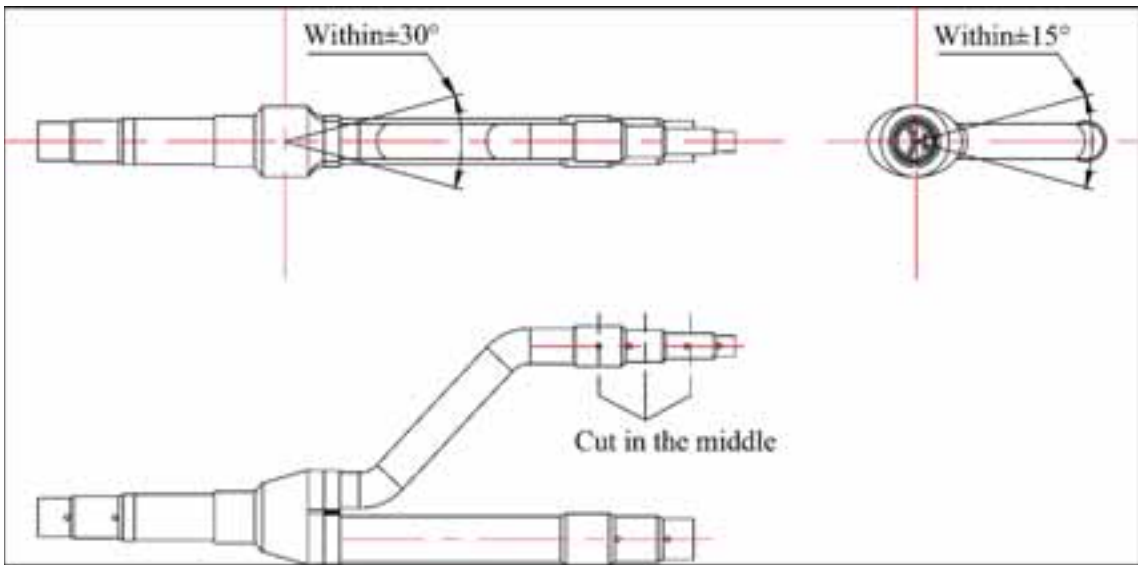
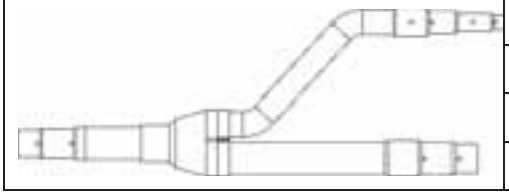


Fig.23

Y-type manifold	Total capacity of downstream indoor unit(s) C (MBH)	Model
	C≤68	FQ01A/A
	68＜C≤102	FQ01B/A
	102＜C≤239	FQ02/A
	239＜C	FQ03/A

(4) Manifold is isolated by insulating material that can withstand at least 120°C (248℉). Manifold attached foam cannot be considered as insulating material.

4.3.3 Thermal insulation for pipeline

(1) For multi VRF system, every copper pipe should be labeled to avoid misconnection.

(2) At the manifold inlet, leave at least 500mm (20 inches) straight pipe section, and for FQ04 manifold, leave at least 800mm (31 inches).

(3) Thermal insulation for pipeline

1) To avoid condensate or water leakage on connecting pipe, the gas pipe and liquid pipe must be wrapped with thermal insulating material and adhesive tape for insulation from the air.

2) For heat pump unit, liquid pipe should withstand at least 70°C (158℉), and gas pipe should withstand at least 120°C (248℉). For cooling only unit, both liquid pipe and gas pipe should withstand at least 70°C (158. Example: Polyethylene foam can withstand 120°C (248℉) and foaming polyethylene can withstand 100°C (212℉).

3) Joints at indoor and outdoor units should be wrapped with insulating material. No clearance should be left between pipe and wall. See Fig.24.

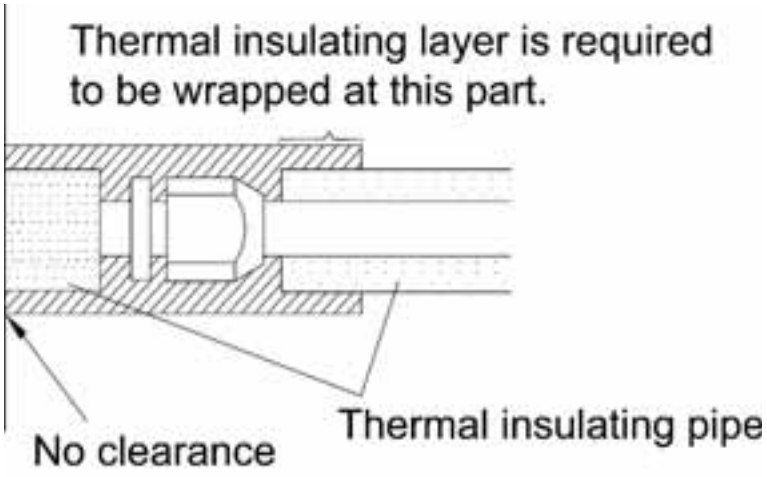


Fig.24

4) Manifold attached foam cannot be considered as insulating material.

5) When wrapping the tape, each layer should cover ½ the width of the tape of the previous layer. Don't wrap the tape too tightly, otherwise the insulation effect will be weakened.

6) After wrapping the pipe, use sealing material to completely fill the hole to prevent wind and rain from entering the room.

4.3.4 Support and protection for pipeline

(1) Support should be made for hanging connection pipe. Distance between each support cannot be over 1m (39 inches).

(2) To prevent accidental damage a pinch board should be added if the pipeline exceeds 1m (39 inches),

4.4 Air Purging and Refrigerant Charge

4.4.1 Air purging

(1) Confirm outdoor liquid and gas valves are closed. Attach vacuum pump to nozzle located on liquid and gas valves. See Fig.25.

(2) When there are more than 2 outdoor units confirm outdoor oil balance valves are closed. See Fig.26.

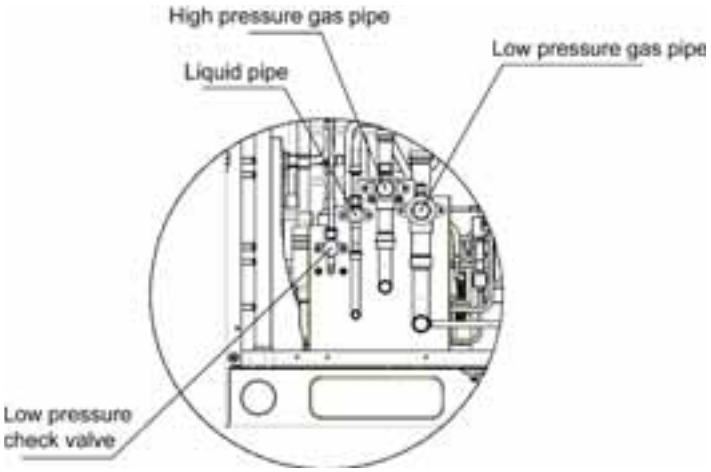


Fig.25

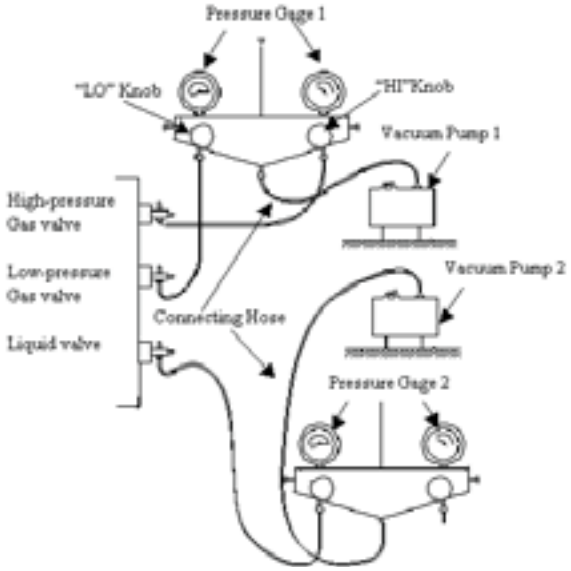


Fig.26

4.4.2 Additional refrigerant

Outdoor unit has been charged with refrigerant before delivery.

Charge additional refrigerant for field-installed connecting pipe. If the pipeline is longer than 1m (39 inches), please refer to the following table for charging amount of refrigerant. (Liquid pipe prevails)

How much additional refrigerant should be charged?

Total refrigerant charging amount R= Pipeline charging amount A + ∑charging amount B of every module

(1) Pipeline charging amount

Added refrigerant quantity A for piping = ∑Liquid pipe length × Added refrigerant quantity for each meter (inch) of liquid pipe

	Diameter of liquid pipe							mm(inch)
	28.6(1-1/8)	25.4(1)	22.2(7/8)	19.05(3/4)	15.9(5/8)	12.7(1/2)	9.52(3/8)	6.35(1/4)

kg/m	0.680	0.520	0.350	0.250	0.170	0.110	0.054	0.022
OZ/inch	0.61	0.47	0.31	0.22	0.15	0.10	0.05	0.02

(2) ∑Refrigerant charging amount B of every module

Refrigerant charging amount B of every module kg(Pounds)		Rated Capacity(1000Btu/h)		
IDU/ODU rated capacity collocation ratio C	Quantity of included IDUs(N)	72	96	120
50%≤C≤90%	N＜4	0	0	0
	N≥4	0.5(1.1)	0.5(1.1)	0.5(1.1)
90%＜C≤105%	N＜4	1(2.2)	1(2.2)	1.5(3.3)
	8＞N≥4	2(4.4)	2(4.4)	3(6.6)
	N≥8	4(8.8)	3.5(7.7)	4(8.8)
105%＜C≤135%	N＜4	2(4.4)	2(4.4)	2.5(5.5)
	8＞N≥4	4(8.8)	3.5(7.7)	4(8.8)
	N≥8	4.5(9.9)	4.5(9.9)	5(11.0)

For example:

The OUD is composed of 3 modules: V5BV-R72WMBK, V5BV-R120WMBK, and V5BV-R120WMBK. The IDUs are made up of 7sets of BDDH-14.0(48)SAK.

IDU/ODU rated capacity collocation ratio C= 48×7/(72+120+120)=108%.The quantity of included IDUs is more than 4 sets. Please refer to the above table.

Refrigerant charging amount B for V5BV-R72WMBKmodule is 4.0kg (8.8pounds).

Refrigerant charging amount B for V5BV-R120WMBKmodule is 4.0kg (8.8pounds).

Refrigerant charging amount B for V5BV-R120WMBKmodule is 4.0kg (8.8pounds).

So, Σ Refrigerant charging amount B of every module=4.0+4.0+4.0=12kg (8.8+8.8+8.8 =26.4pounds).

Suppose the Pipeline charging amount A=Σ Liquid pipe length × refrigerant charging amount of every 1m (39.37inch) liquid pipe=25kg (55.1 pounds)

Total refrigerant charging amount R=25+12=37kg (55.1+26.4=81.5pounds).

After confirming that there is no leakage from the system, when the compressor is not in operation, charge additional R410A specified to the unit through the liquid pipe valve of the outdoor unit. If required additional refrigerant cannot be quickly filled for increase of pressure in the pipe, set the unit at cooling startup and then fill the refrigerant from gas valve of outdoor unit. If ambient temperature is low, the unit can’t be set to cooling mode, but only to heating mode.

4.5 Electric Wiring

4.5.1 Wiring precautions

WARNING
(1) All parts, materials, and electric work should be in accordance with local and national codes.
(2) Rated voltage and dedicated power supply should be used.
(3) Power cord should be securely attached. Never forcibly pull the power cord.
(4) Power cord should be sufficiently sized for voltage. Damaged power cord and connecting wire should be replaced by appropriate cable.
(5) All the electrical work should be performed by professional personnel as per local law, regulation and this manual.
(6) Connect the unit to the dedicated grounding device and make sure it is secure.
(7) Air switch and circuit breaker are required. Air switch should have both magnetic trip and thermal trip functions so as to protect the unit if short-circuit or overload occurs. D-type breaker should be used.
(8) Wiring diagram attached on the unit should be followed.

4.5.2 Wiring of power cord

Every unit should have corresponding circuit breaker and overload protection. A main switch is required to control power supply. See Fig.34.

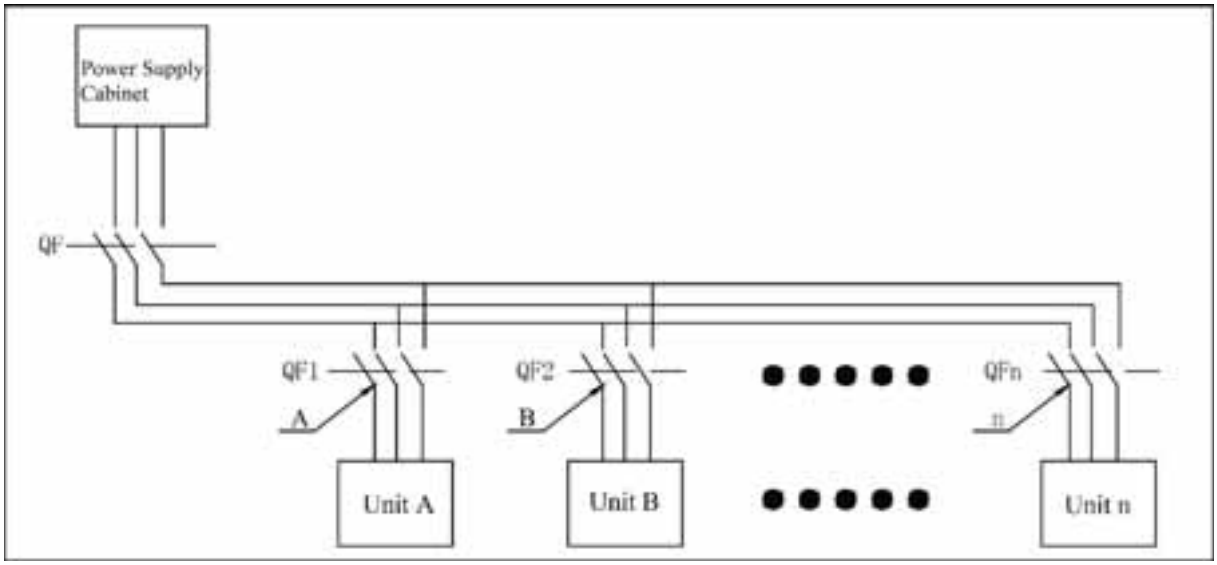


Fig.27

Outdoor Unit

Outdoor unit cooling capacity MBH / kW	Power Supply	Fuse Capacity	Minimum Circuit Ampacity	Maximum Overcurrent Protection
	V/ Ph /Hz	A	A	A
72 / 22.4	208V/230V 3~ 60Hz	45	30	45
96 / 28	208V/230V 3~ 60Hz	70	45	70
120 / 33.5	208V/230V 3~ 60Hz	100	74	100
144 / 44.8	208V/230V 3~ 60Hz	70	55	70
168 / 50.4	208V/230V 3~ 60Hz	90	70	90
192 / 55.9	208V/230V 3~ 60Hz	125	99	125
216 / 61.5	208V/230V 3~ 60Hz	125	111	125
240 / 67	208V/230V 3~ 60Hz	150	140	150
264 / 78.4	208V/230V 3~ 60Hz	150	123	150
288 / 84	208V/230V 3~ 60Hz	150	136	150
312 / 89.5	208V/230V 3~ 60Hz	175	164	175
336 / 95	208V/230V 3~ 60Hz	200	177	200
360 / 100.5	208V/230V 3~ 60Hz	225	205	225

WARNING
(1) Specification of circuit breaker and power cord based on the unit's maximum power (max. current).
(2) Specification of power cord is based on the working condition where ambient temperature is 40 °C (104 °F) and multi-core cable with copper conductor(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 is different, please adjust according to national standard.
(3) Copper-core cable must be used.
(4) The above sectional area is suitable for a maximum distance of 15m (49 feet). If it's over 15m (49 feet), sectional area must be expanded to prevent overload current from burning the wire or causing fire hazard.
(5) Specification of circuit breaker is based on the working condition where the ambient temperature of circuit breaker is 40°C (104°F). If working condition is different, please adjust according to national standard.
(6) The air switch should include magnetic trip function and thermal trip function so that system can be protected from short circuit and overload.
(7) An all-pole disconnect switch having a contact separation of at least 3mm (1/8inch) in all poles should be connected with fixed wiring.

4.5.3 Connection of power cord

WARNING
(1) Before accessing terminals, all supply circuits must be disconnected.

(2) If units are type I electrical appliances, they must be reliably grounded.
(3 Ground resistance must be in accord with requirements of local standard.
(4) The green-yellow wire within units is the ground wire. Do not use it for other purposes. Nor should it be cut off or secured by tapping screws. Otherwise, it may cause electric shock.
(5) Power supply must have reliable ground terminal. Do not connect ground wire to the following places: 1) Water pipe. 2) Gas pipe. 3) Drainage pipe. 4) Other places that are considered unreliable.
(6) Power cord and communication wire should be separated, with a distance of more than 20cm (8 inches). Otherwise, system's communication may not work.

Steps and illustrations of power cord connection:

(1) Knock out the opening that's used for leading the external power cord. Place the rubber ring on the opening. Then lead the cable through the opening. Connect L1, L2, L3 of power cord and ground wire separately to the wiring board (for power supply) that are marked with L1, L2, L3 and the ground screw.

(2) Use cable ties to secure the cable.

(3) Lead the power cord as instructed in the graphic below:

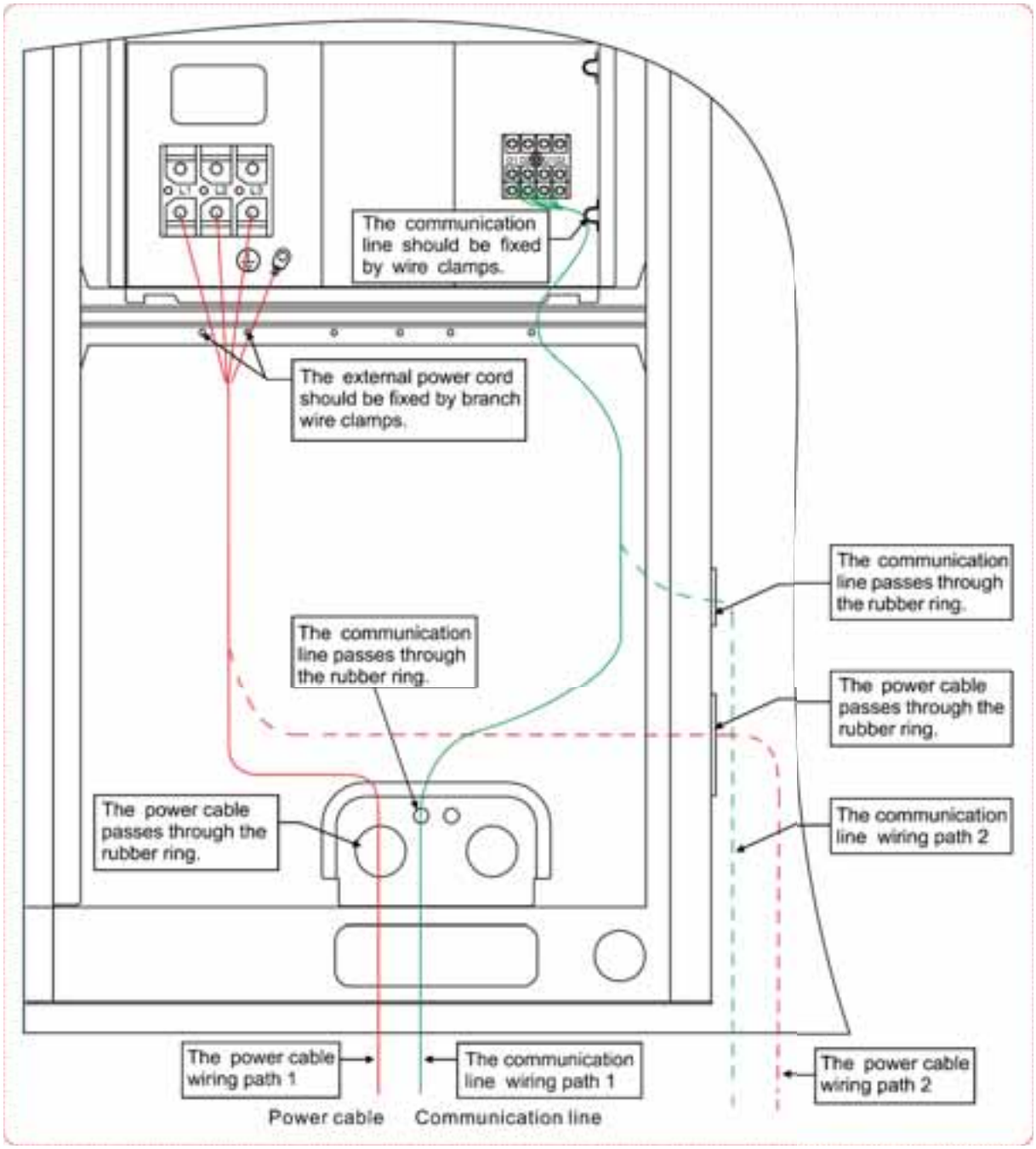


Fig. 28

4.6 System Communication

4.6.1 Communication system include:

(1) Communication among outdoor basic modules.

(2) Communication between ODU and IDU.

(3) Communication among IDUs.

(4) Communication between IDU and wired controller.

(5) Connection between IDU and light board receiver.

(6) Communication between different refrigeration systems.

(7) Graphics of general communication connection.

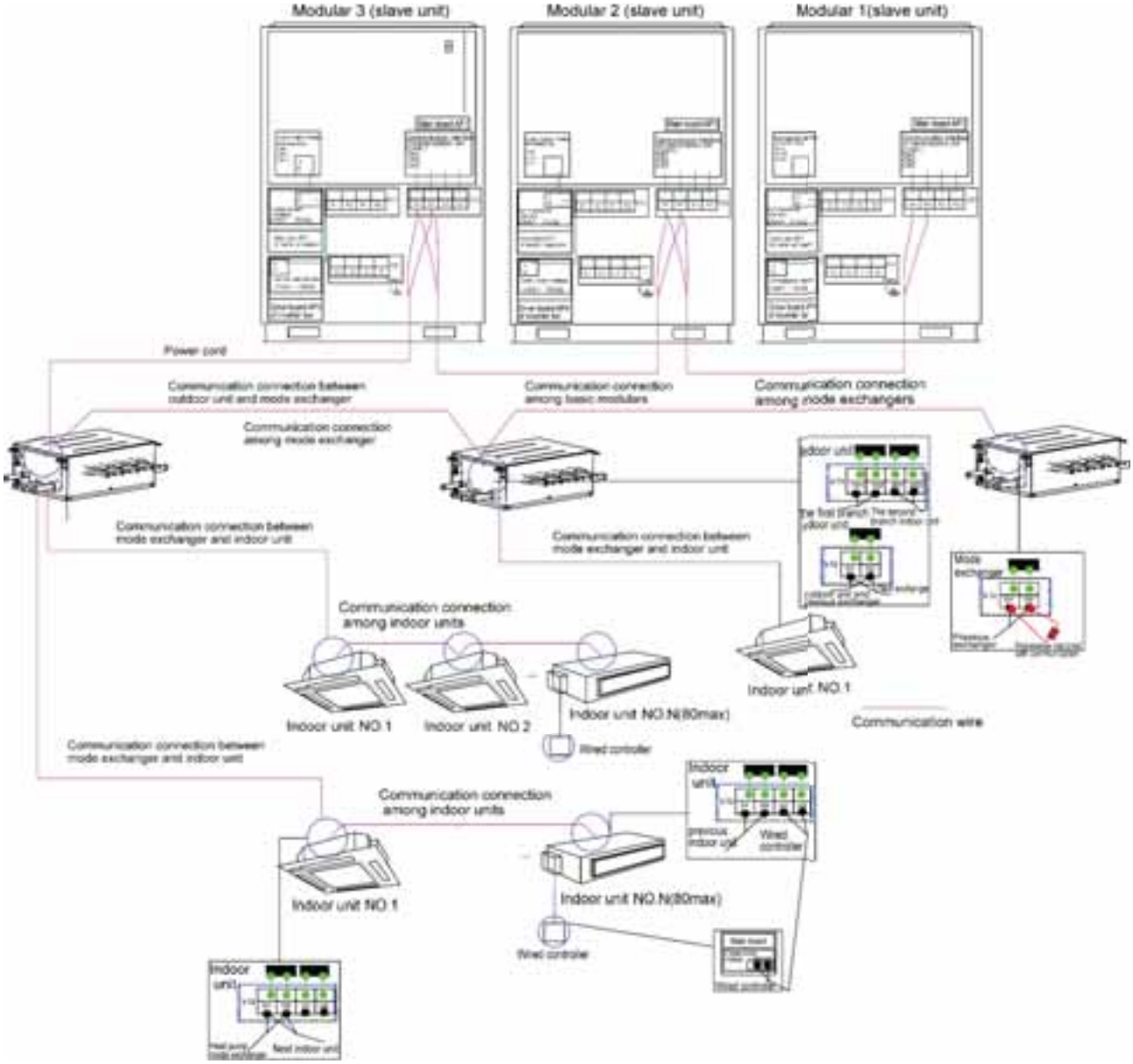


Fig.29

4.6.2 Communication mode of V5 Modular DC Inverter Units

CAN bus mode is used for communication between IDU and ODU and communication among IDUs.

4.6.3 Selection and connection mode of V5 communication material

4.6.3.1Select communication material

NOTICE! **If air conditioners are installed in places where there's strong electromagnetic interference, the communication wire of IDU and wired controller must be shielded and the communication wire between IDU and IDU/ODU must use shielded twisted pair.**

(1)Select communication wire between IDU and wired controller

Material type	Total length of communication line between IDU unit and wired controller L m(feet)	Wire size	Remarks
Light/Ordinary polyvinyl chloride sheathed cord.	L≤250(820)	2×AWG18~ 2×AWG16	1. Total length of communication line can't exceed 250m (820 feet). 2. The cord shall be Circular cord (the cores shall be twisted together). 3. If unit is installed in places with intense electromagnetic field or strong interference, it is necessary to use shielded wire.

Graphic of connection between IDU and wired controller

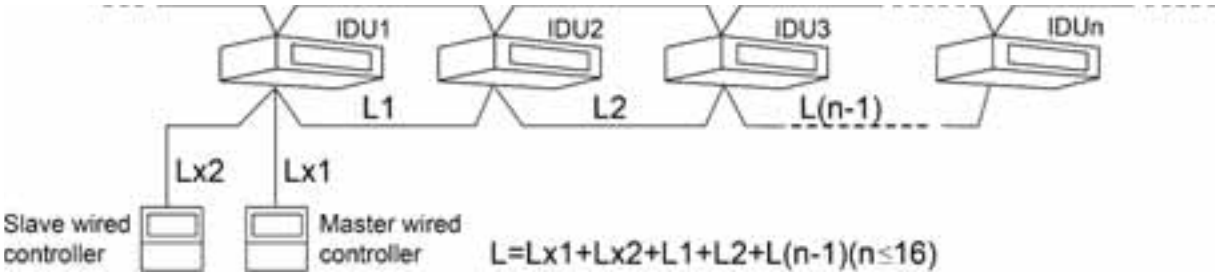


Fig.30

(2)Select communication wire between ODU and IDU

Material Type	Total Length L(m) of Communication Cable between IDU Unit and IDU (ODU) Unit m(feet)	Wire size	Remarks
Light/Ordinary polyvinyl chloride sheathed cord.	L≤1000(3280)	≥2×AWG18	1. If the wire diameter is enlarged to 2 ×AWG16, the total communication length can reach 1500m (4921 feet). 2. The cord shall be Circular cord (the cores shall be twisted together). 3. If unit is installed in places with intense electromagnetic field or strong interference, it is necessary to use shielded wire.

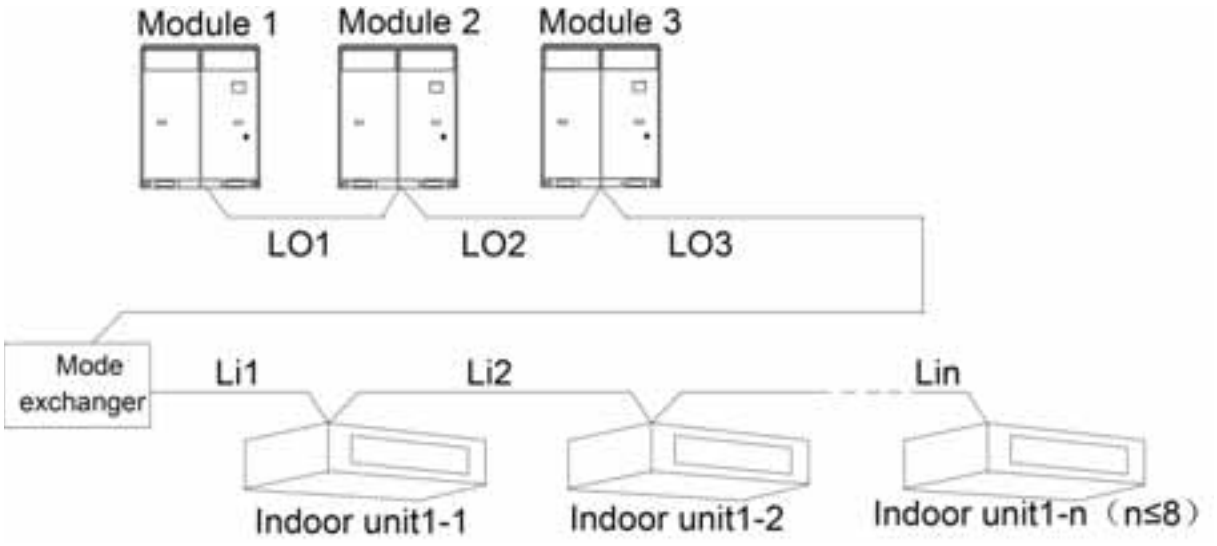


Fig.31

NOTE：All of the selected communication wire must be consistent with local laws and regulations.

4.6.3.2 Connection mode of communication

(1) All communication wires of V5 must be connected in series.

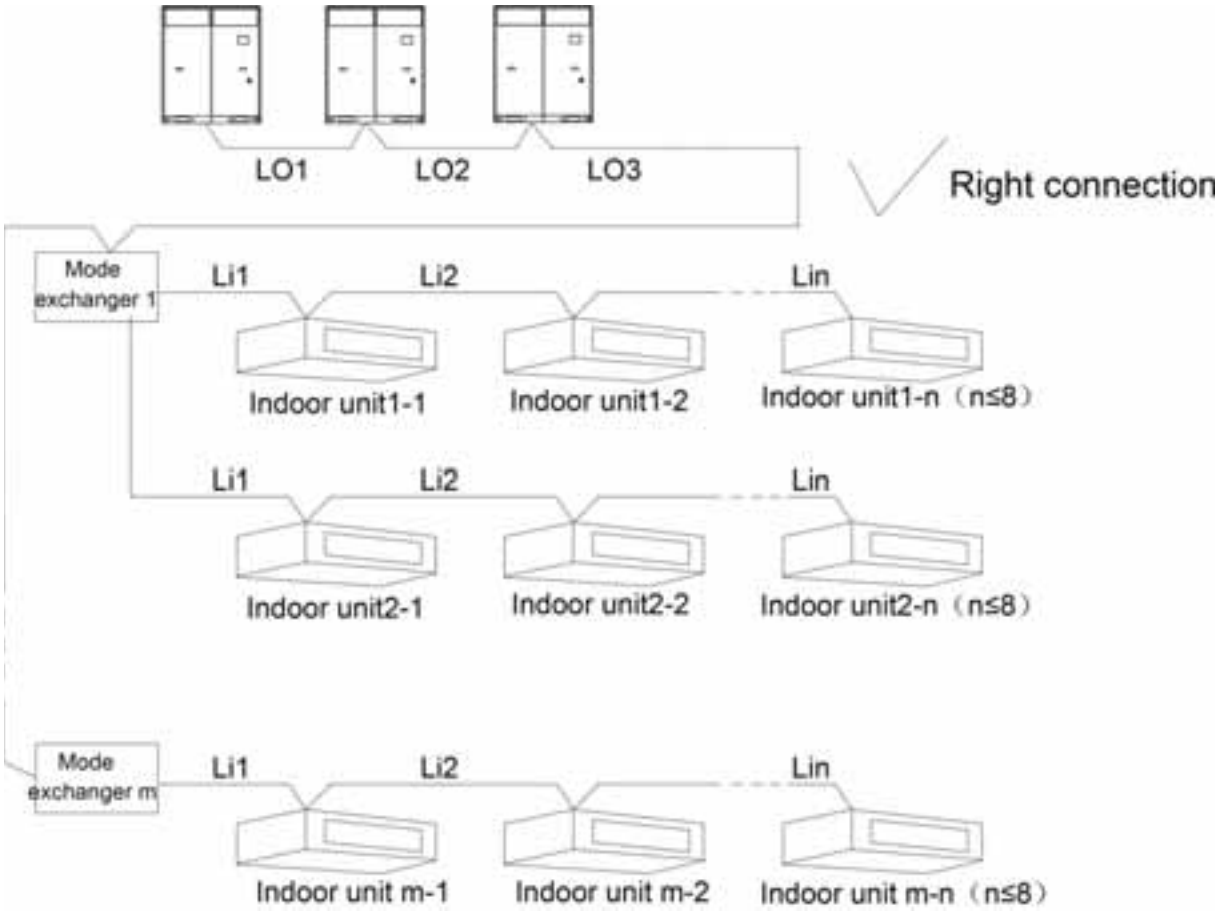


Fig.32

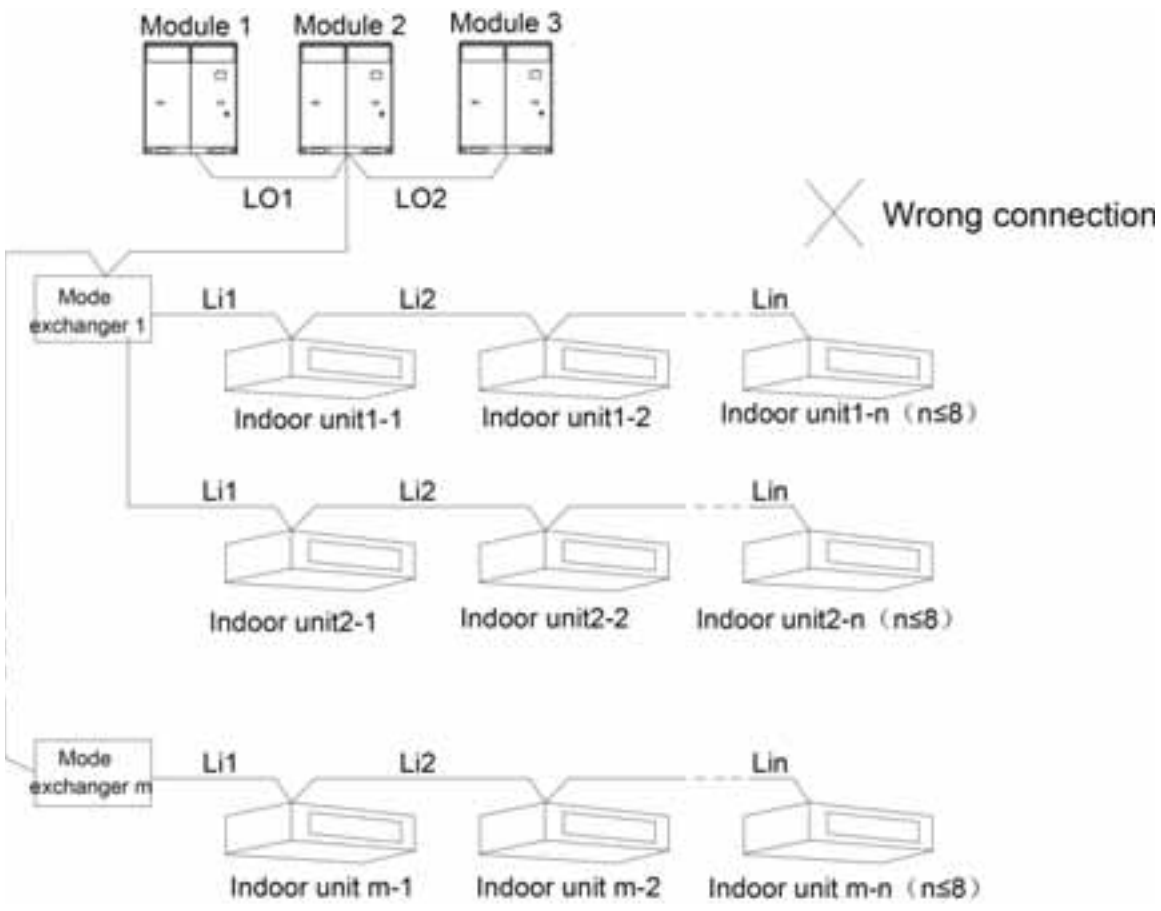

Module 1
Module 2
Module 3
LO1
LO2
Wrong connection
Mode exchanger 1
Li1
Li2
Lin
Indoor unit1-1
Indoor unit1-2
Indoor unit1-n（n≤8）
Li1
Li2
Lin
Indoor unit2-1
Indoor unit2-2
Indoor unit2-n（n≤8）
Mode exchanger m
Li1
Li2
Lin
Indoor unit m-1
Indoor unit m-2
Indoor unit m-n（n≤8）

Fig.33

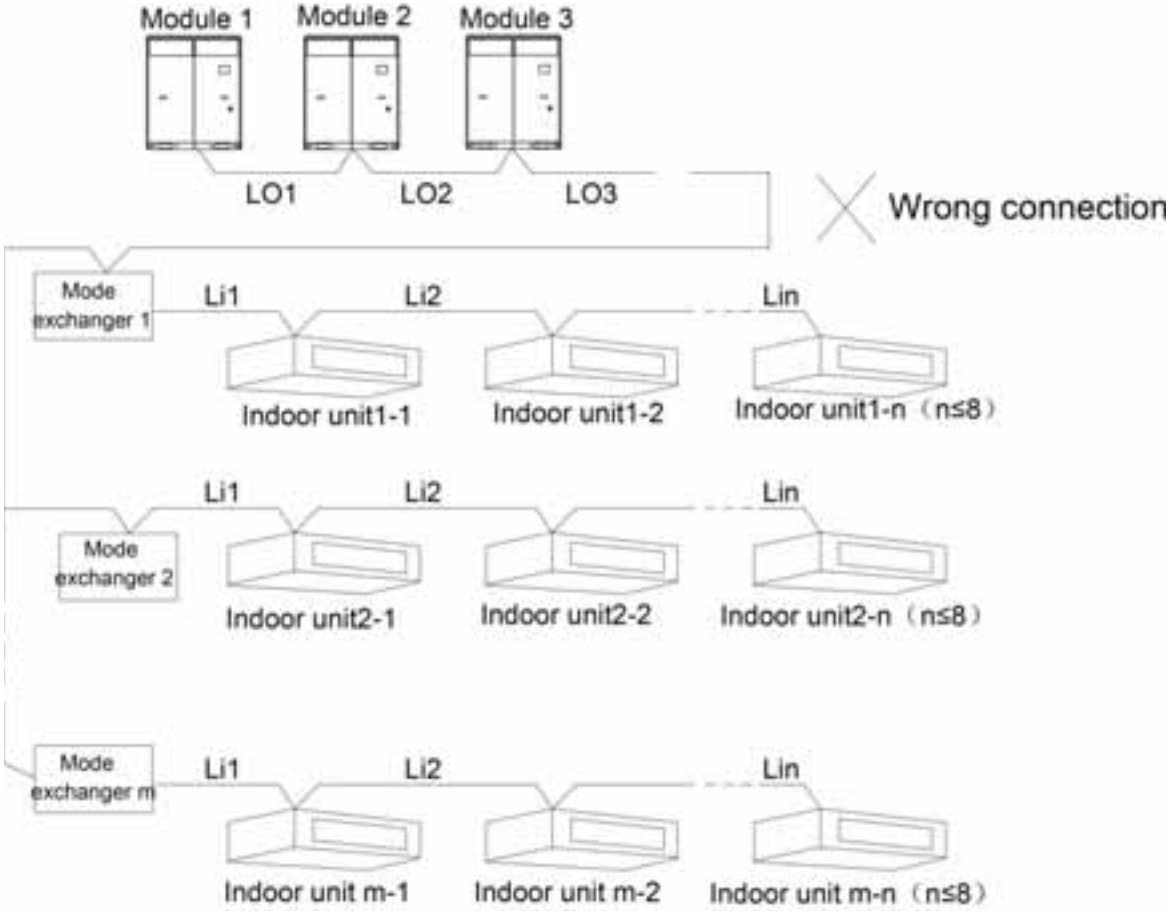

Module 1
Module 2
Module 3
LO1
LO2
LO3
Wrong connection
Mode exchanger 1
Li1
Li2
Lin
Indoor unit1-1
Indoor unit1-2
Indoor unit1-n（n≤8）
Li1
Li2
Lin
Mode exchanger 2
Indoor unit2-1
Indoor unit2-2
Indoor unit2-n（n≤8）
Mode exchanger m
Li1
Li2
Lin
Indoor unit m-1
Indoor unit m-2
Indoor unit m-n（n≤8）

Fig.34

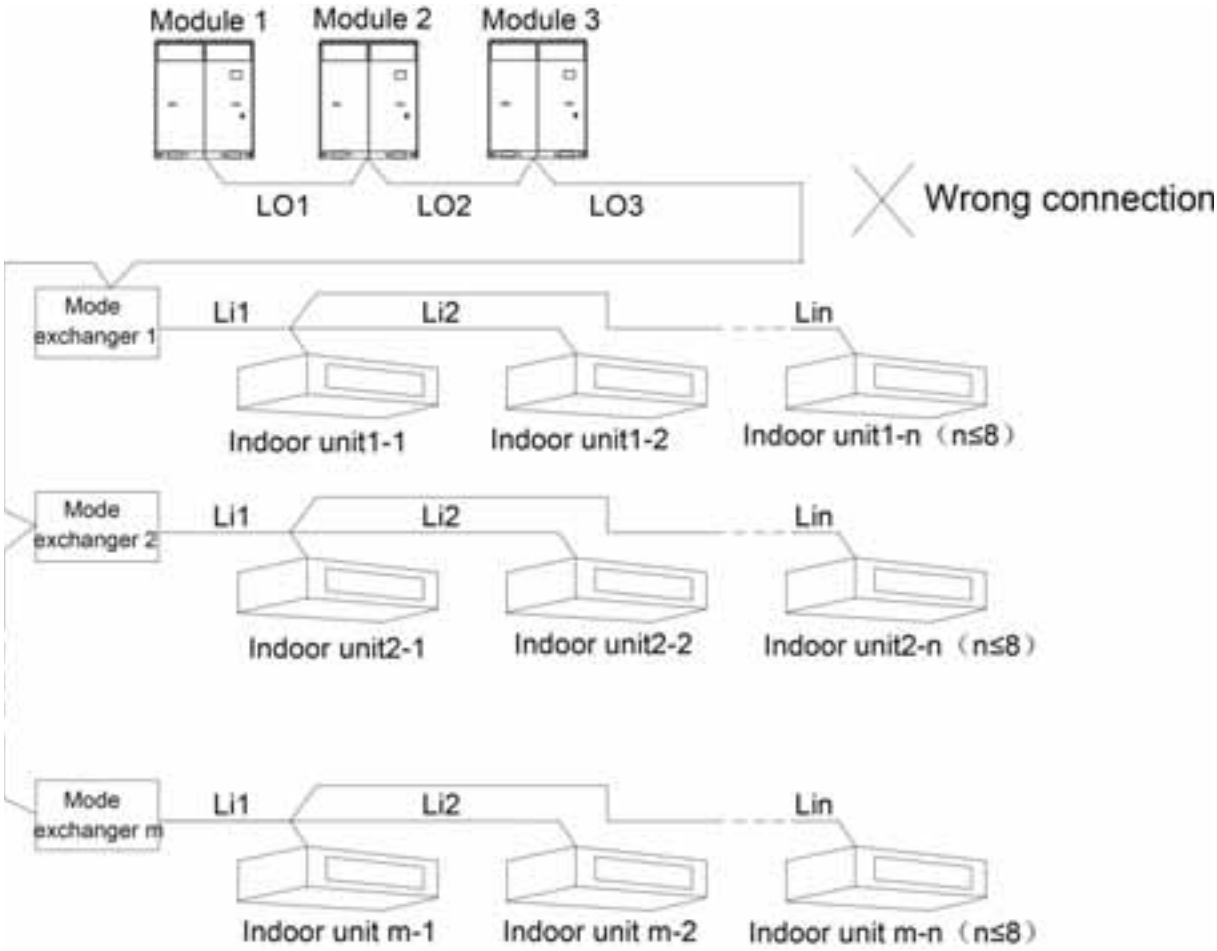


Fig.35

(2) All communication wires of V5 are connected by screws.

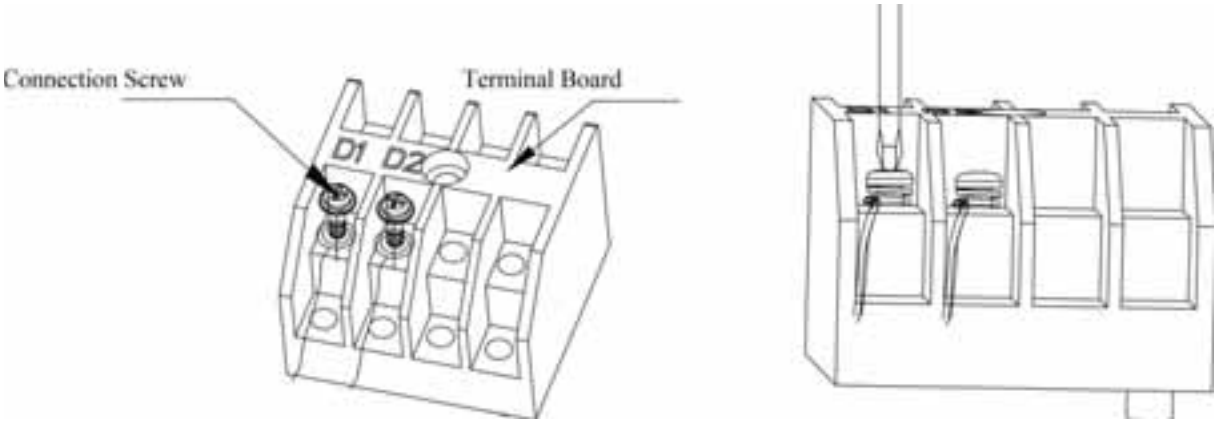


Fig.36

(3) It is preferred that single communication wires be used. If a single wire is too short, another wire may be welded or pressure welded to it. DO NOT simply twist the wires together.

4.6.4 Communication address

Auto addressing technology is used for V5 IDU and ODU. No need to set address codes manually. Only the addresses of master unit and central control are needed to be set (address of central control is only needed when there are multiple refrigeration systems).

NOTICE! **When installing remote monitor or central controller, you must input the name and address code for each IDU into the software manually. For detail operation methods, please refer to the *V5 Installation and Maintenance Manual.***

4.7 Connection Method and Steps for System Communication

4.7.1 Communication connection between IDU and ODU

NOTICE! **The centralized controller can be installed as needed.**

Connect IDU and ODU via terminal D1/D2 of wiring board XT2. Below are the connection graphics for a single unit and for modular units:

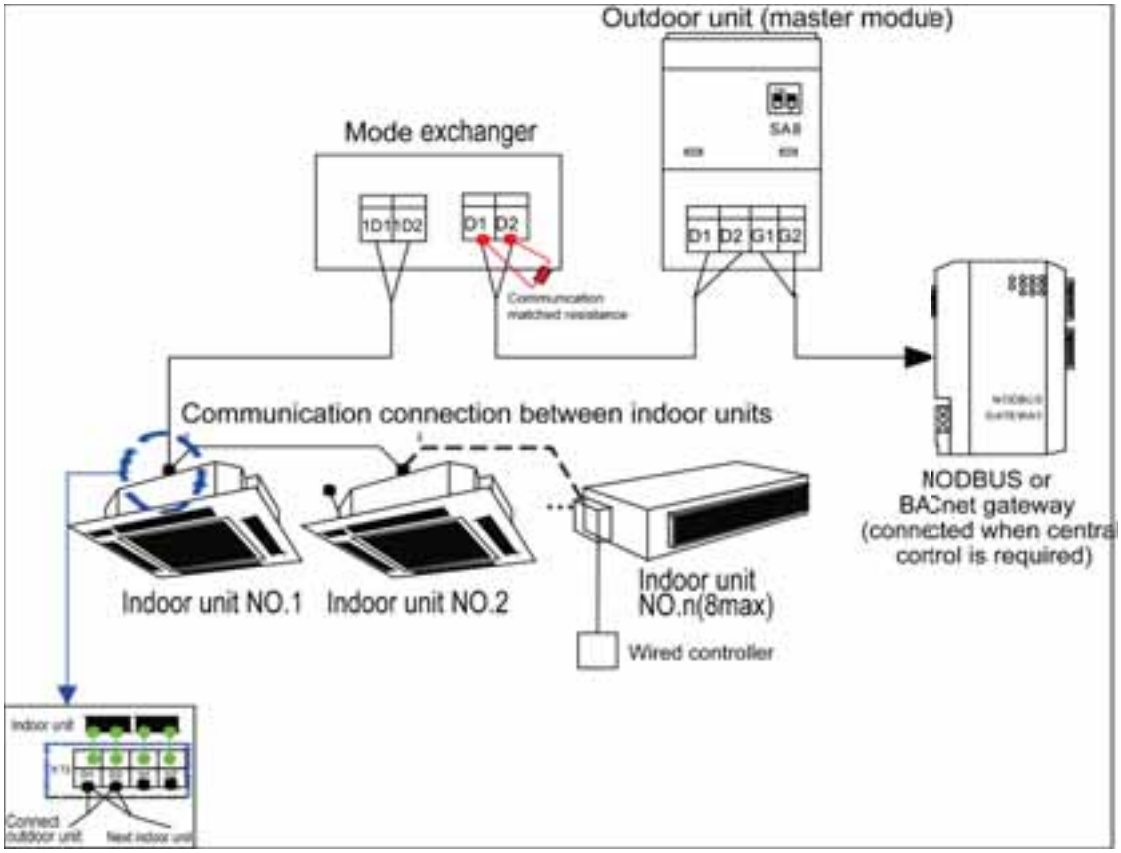


Fig.37 Connection of communication for single-module system and single-module converter system

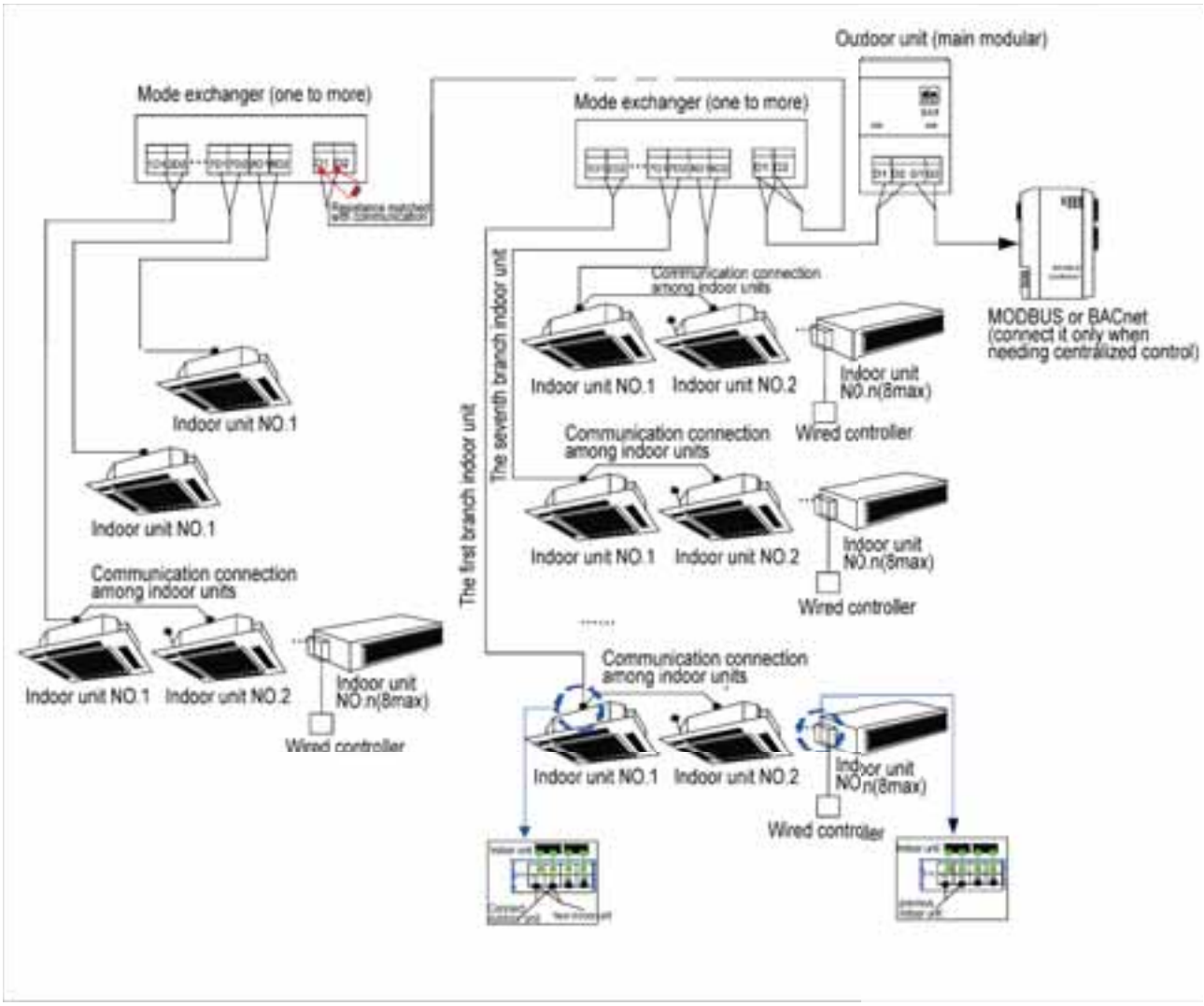


Fig.38 Connection of communication for single-module system and multi-module converter system

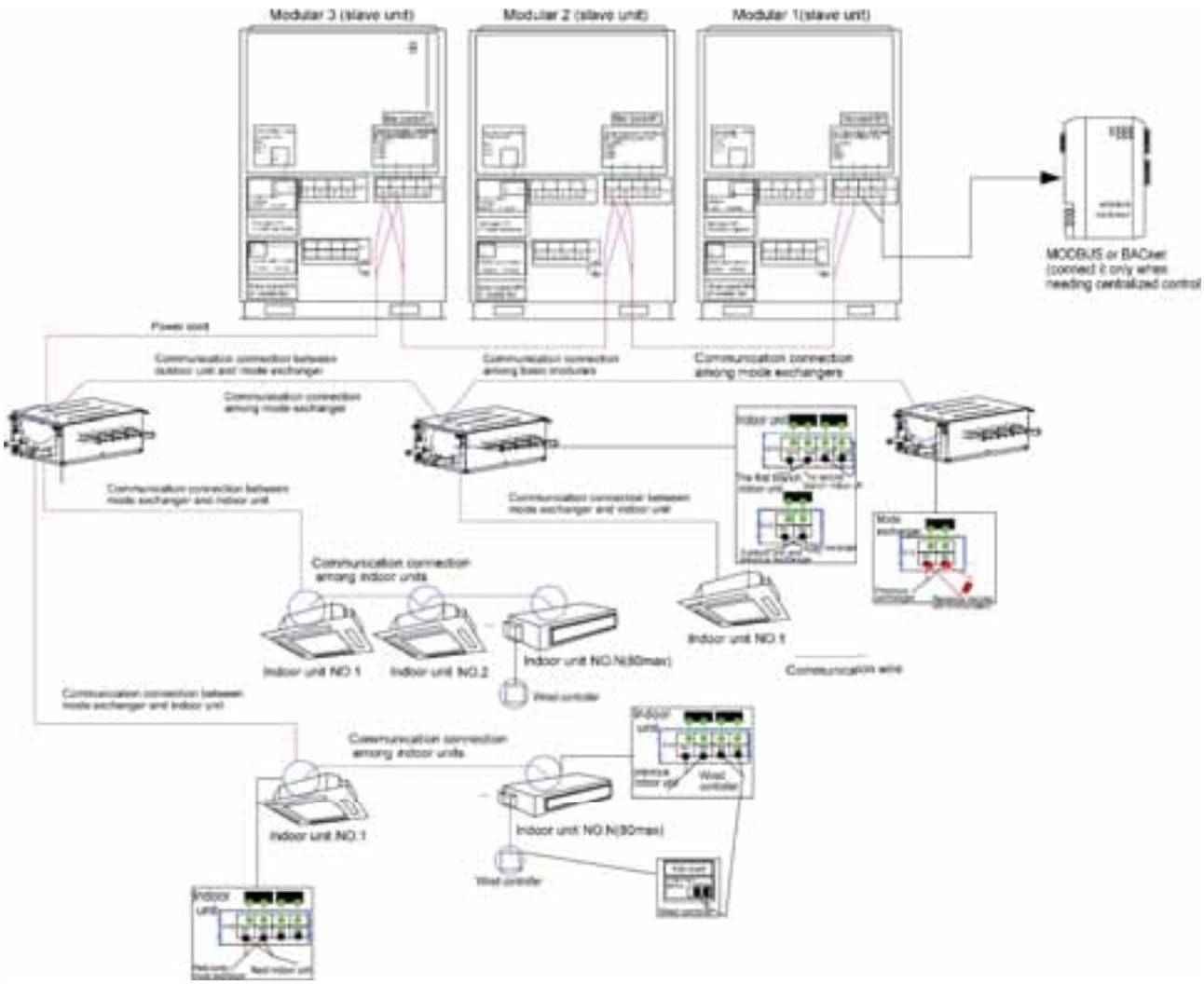


Fig.39 Connection of communication for multi-module system and multi-module converter system

NOTICE
(1)If there are multiple outdoor modules, then the master unit must be the first outdoor module on the communication wire and should not connect with IDU (master unit is set by SA8 of the outdoor main board).
(2) If there are multiple outdoor modules, then indoor units must be connected with the last slave module of ODU (slave module is set by SA8 of the outdoor main board).
(3) Communication wire and power cord must be separated.
(4) Communication wire must be a single cord. Splicing is not allowed.
(5) IDUs must be connected in series. The last IDU must be connected with the communication matched resistance (supplied in the list of ODU spare parts).

4.7.2 Communication connection between IDU and wired controller

There are 4 kinds of connection between IDU and wired controller, as shown below:

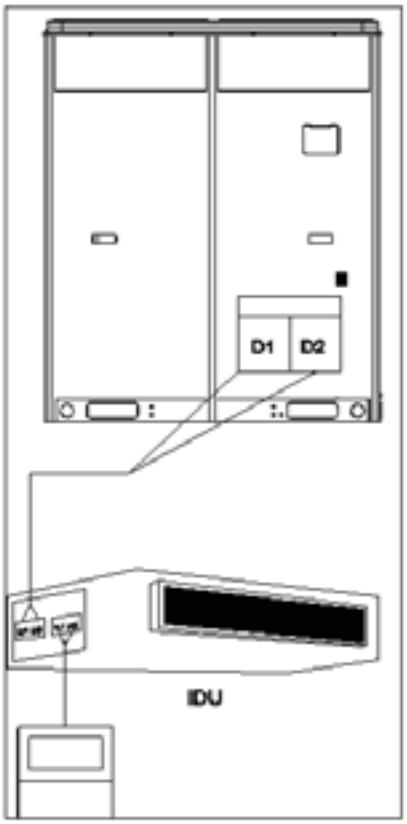


Fig.40 One wired controller controls one IDU

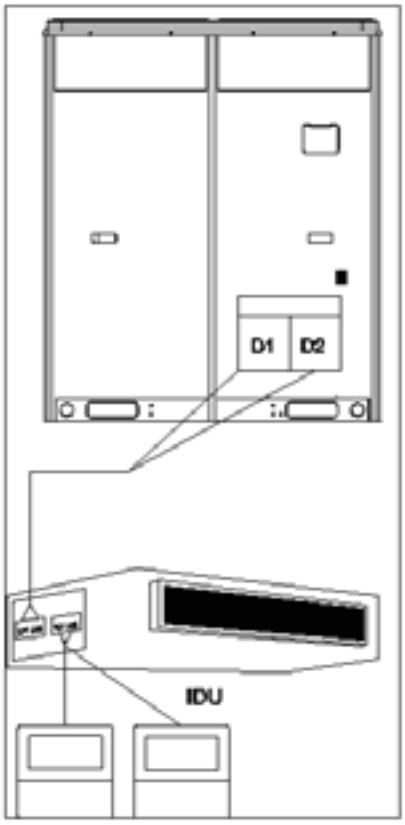


Fig.41 Two wired controller controls one

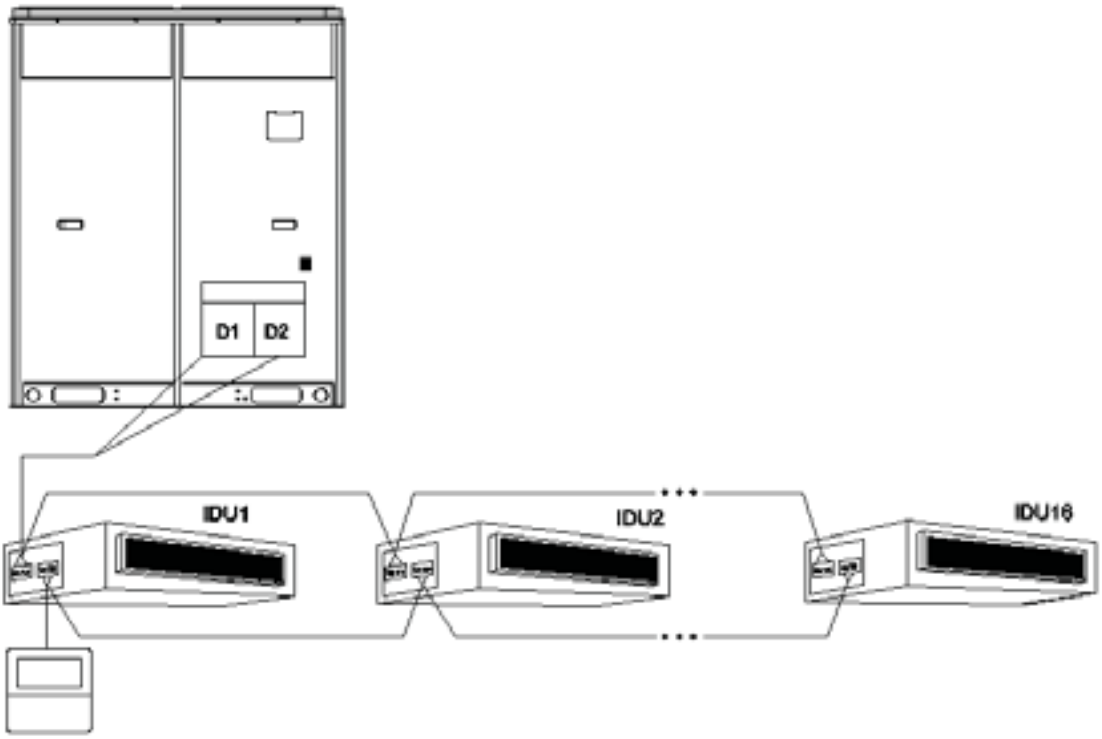


Fig.42 One wired controller controls multiple IDUs

Fig.43 Two wired controllers control multiple IDUs

When two wired controllers control multiple IDUs, the wired controller can be connected to any single IDU, provided that the connected IDU is of the same series. Meanwhile, one and only one of the wired controllers must be set as a slave controller. At most 16 IDUs can be controlled by wired controllers and the connected IDUs shall be within a same IDU network.

No matter if unit is turned on or off, slave controller can be set.

How to set a slave controller: hold “function” button on the designated controller for 5s, and temperature display changes to C00. Continue holding “function” button for 5s and parameter code P00 displays.

Press ▲ button or ▼ button to select parameter code P13. Press “mode” button to switch to setup of parameter values. Then the parameter value will blink. Press ▲ button or ▼ button to select code 02. And then press “confirm/cancel” to finish setting.

Continue to press “confirm/cancel” to return to the previous display until you exit from the setup of parameter values.

Below are user’s parameter settings:

Parameter code	Parameter name	Parameter scope	Default value	Remark
P13	Set up address for wired controller	01: master wired controller 02: slave wired controller	01	When 2 wired controllers control one or more IDUs, they must have different addresses. Slave wired controller (02) can only set up parameters for its own address.

4.7.3 Communication connection between duct type IDU and light board receiver

When the duct type IDU needs to be connected to light board remote receiver, it can be connected via Dsp1 and Dsp2 on the IDU main board.

IDU type	Connection wire	Main board interface of corresponding IDU
Duct type IDU	Between boards (17-core)	Dsp1 (direct to 8-core interface) Dsp2 (direct to 9-core interface)

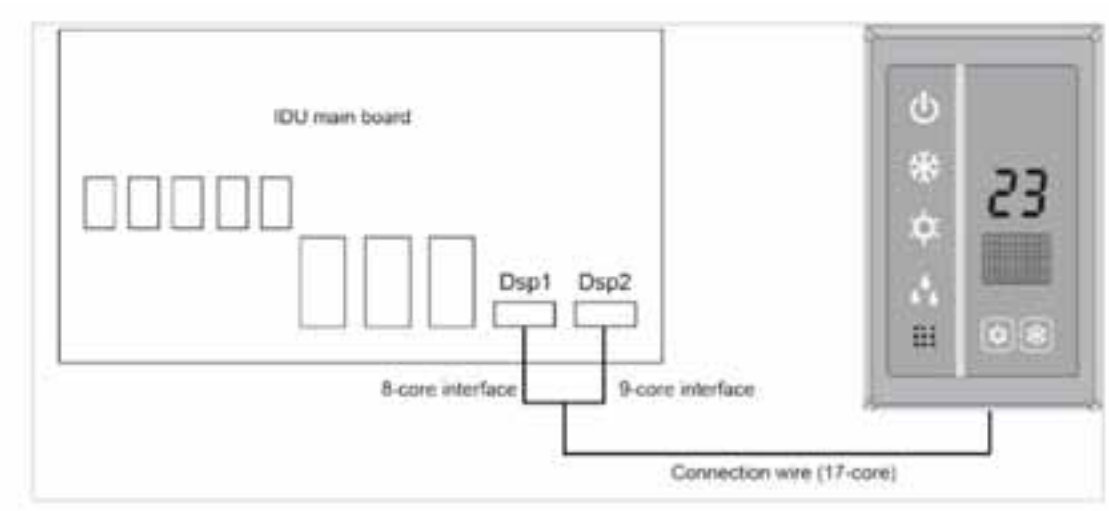


Fig.44

NOTICE
(1) Wired controller and light board remote receiver can be used at the same time.
(2) When light board remote receiver is used, please use remote controller at the same time.

4.7.4 Communication connection of central controlling units

NOTICE! **The centralized controller can be installed when desired.**

Port connection G1 and G2 on the wiring board XT2 of master unit among each multi VRF system (see below)

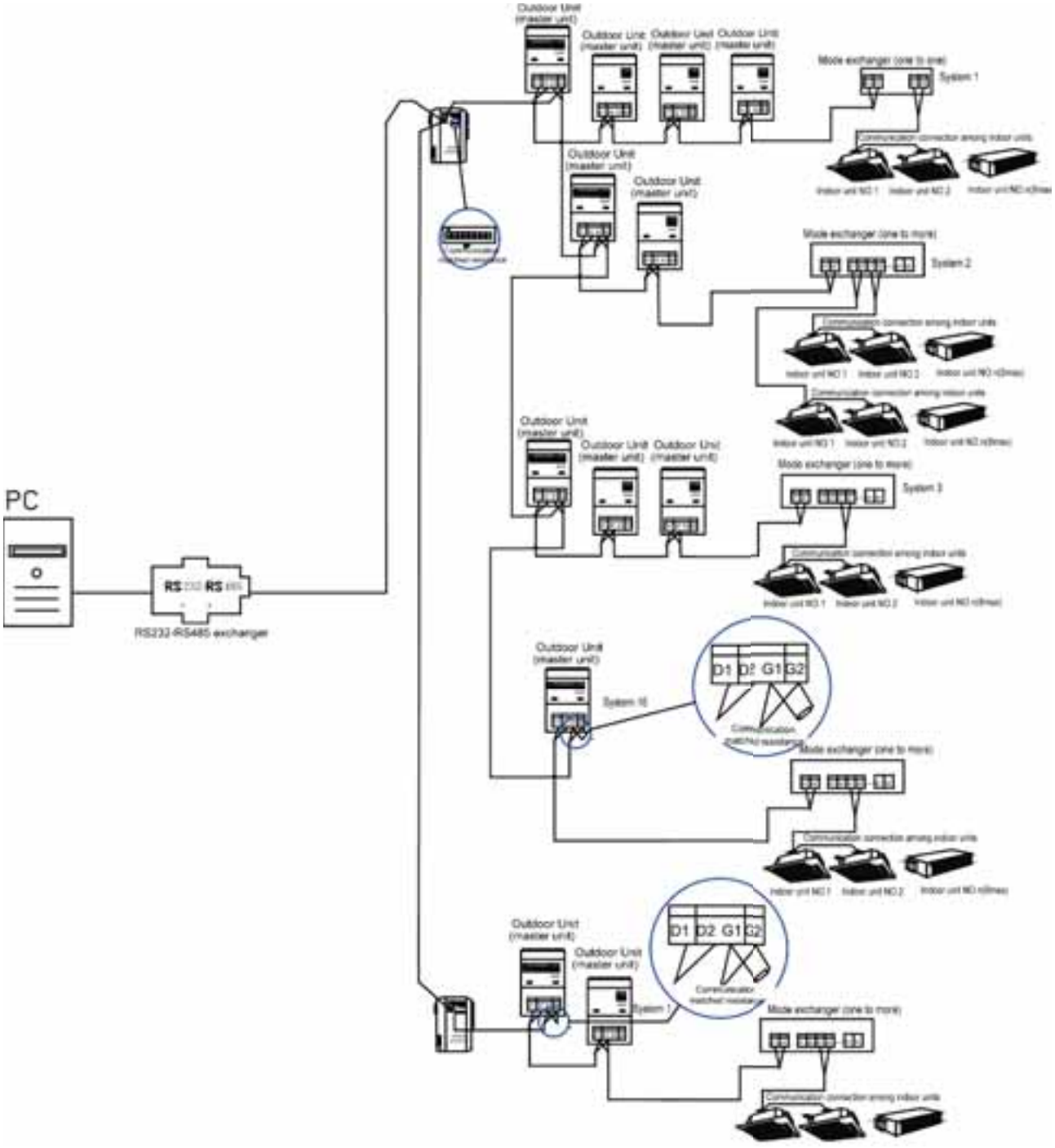


Fig.45

4.8 External Electrical Wiring Diagram

Each unit should be equipped with a circuit breaker for short circuit and overload protection. A separate circuit breaker shall be provided to connect or disconnect power of the entire system.

4.8.1 External wiring diagram of a single unit

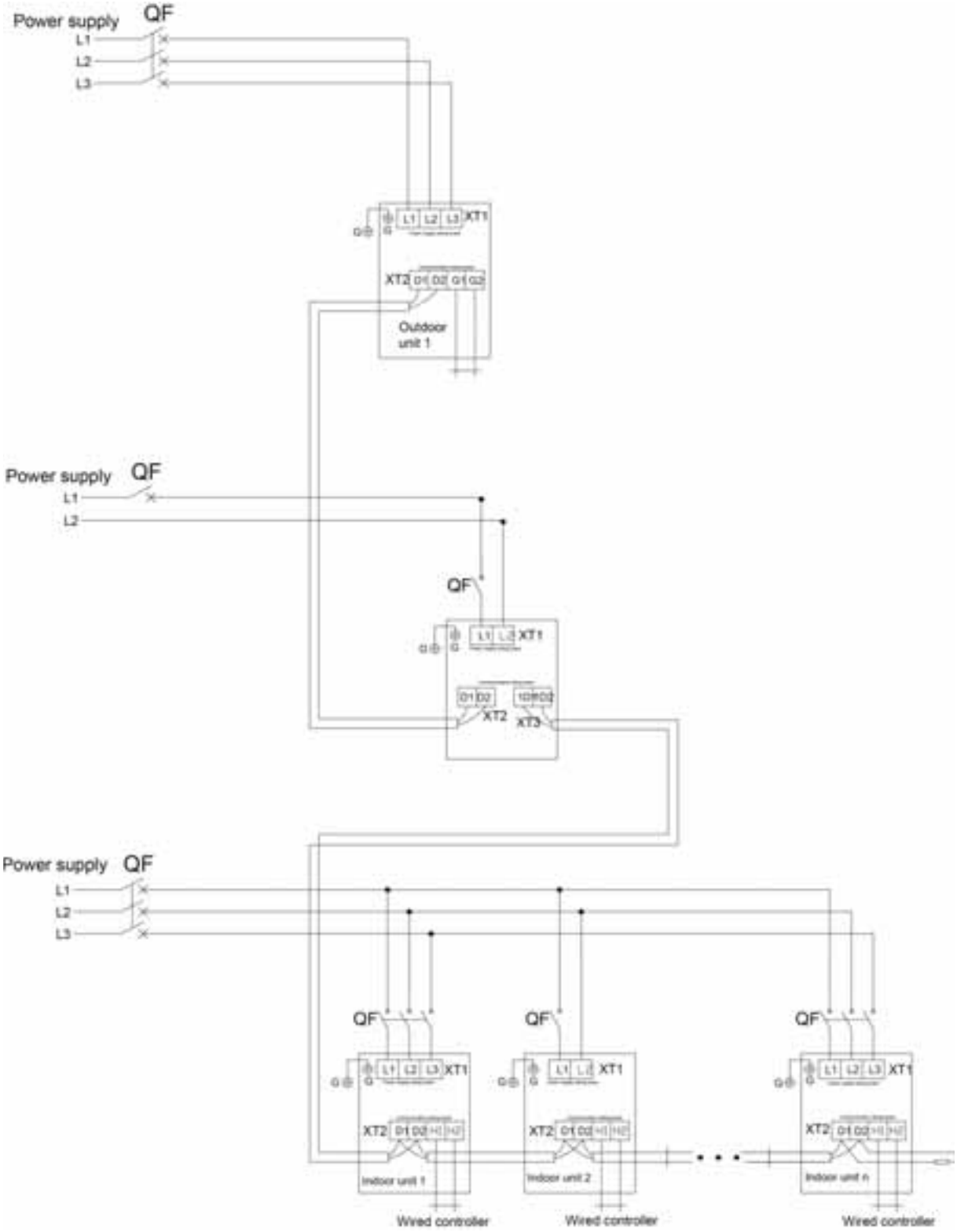


Fig.46

NOTICE! **Maximum number of IDU is based upon ODU capacity. For details, please refer to**

the introduction of units' combination.

4.8.2 External wiring diagram of modular connection

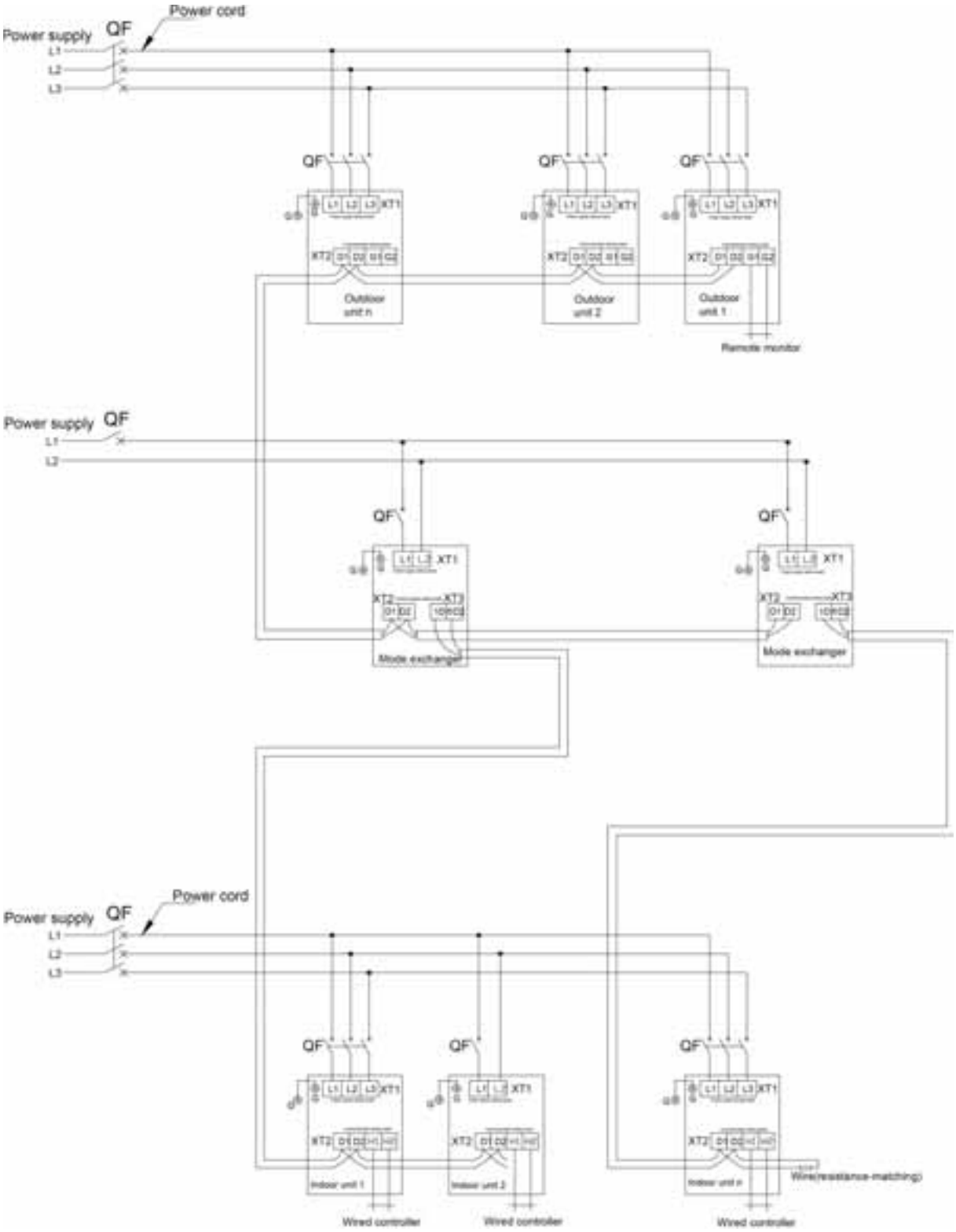


Fig.47

NOTICE! **Maximum number of ODU (N) and maximum number of IDU (n) are based on the combination type of ODU. For details, please refer to the introduction of units' combination.**

5 Check Items after Installation and Trial Run

5.1 Check Items after Installation

Check items	Possible conditions due to improper installation	Check
The unit is installed securely?	Unit may fall, vibrate or emit noise	
Gas leakage test is taken or not?	Insufficient cooling (heating) capacity	
Unit is properly insulated?	There may be condensation and dripping.	
Does the unit drain well?	There may be condensation and dripping.	
Is the voltage in accordance with the rated voltage specified on the nameplate?	Unit may have malfunction or components may get damaged.	
Is the electric wiring and pipe connection installed correctly?	Unit may have malfunction or components may get damaged.	
Unit is securely grounded?	Electrical short	
Power cord meets the required specification?	Unit may have 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.	
Is the address code of outdoor modules and the module quantity correct?	The unit cannot run normally. Communication malfunction might occur.	
Does the wired controller connected properly and are all indoor units address codes accurate?	The unit cannot run normally. Communication malfunction might occur.	
Has the communication line been connected correctly?	The unit cannot run normally. Communication malfunction might occur.	
Is the piping connection and valve status correct?	The unit cannot run normally. The unit might be damaged.	
Does the external power cord sufficient for electrical voltage?	The unit cannot run normally. Phase sequence error may occur.	

5.2 Trial Run

Note: during debugging, one AND ONLY ONE module must be set as a master module.

During debugging, one AND ONLY ONE IDU must be set as a master IDU.

When no special requirement is needed, there's no need to set other functions. Unit can operate according to default settings. When special function is needed, please read the Service Manual or Debugging and Maintenance Manual.

5.2.1 Preparation before trial run

(1) The power supply should be turned on only after the installation is complete.

(2) Check that all the control wires and cables are connected correctly and safely. Completely open the gas and liquid valves.

(3) All the objects like metal filings and other debris should be cleared away after installation.

(4) Check if the unit and piping system has been damaged due to transportation.

(5) Check the terminals of electrical element and the phase sequence.

(6) Check the valve: For single-module unit, fully open the gas and liquid valve and close oil balance valve. For dual/three module unit, fully open the gas, liquid valve and oil balance valve.

5.2.2 Trial run

5.2.2.1 Notices

(1) Before test operation, make sure unit is power on and compressor has been preheated for more than 8 hours. Touch the compressor to check whether it's noticeably preheated. Staring the test operation without preheating the compressor might cause damage. Debugging must be performed by professional technicians.

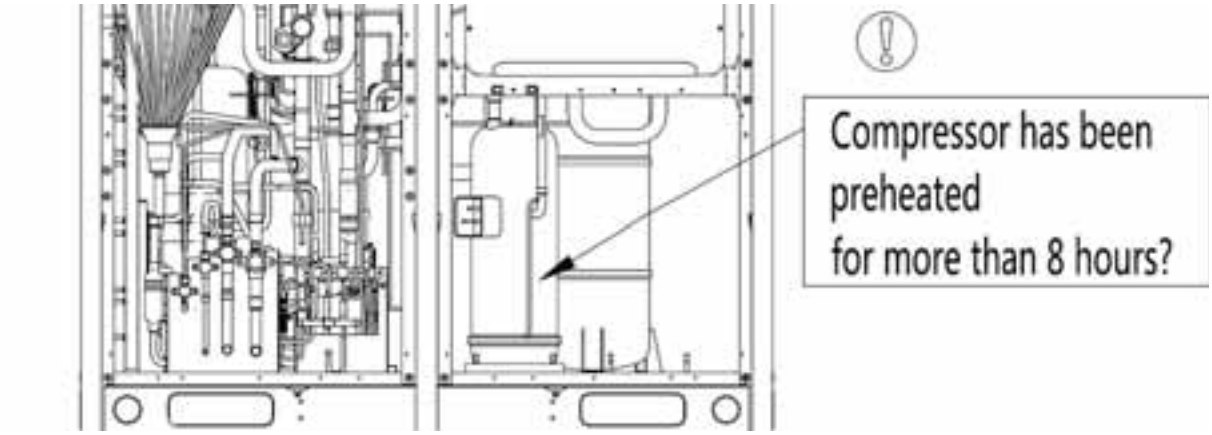


Fig.48

(2) When debugging starts, system will operate according to the ambient temperature.

1) When outdoor temperature is above 20º C (68°F), debugging shall be in cooling mode.

2) When outdoor temperature is below 20º C (68°F), debugging shall be in heating mode.

(3) Before debugging, confirm again whether the cut-off valve of each basic module is fully turned on.

(4) During debugging, front panel of the outdoor unit must be fully closed; otherwise, debugging accuracy will be affected (see below).

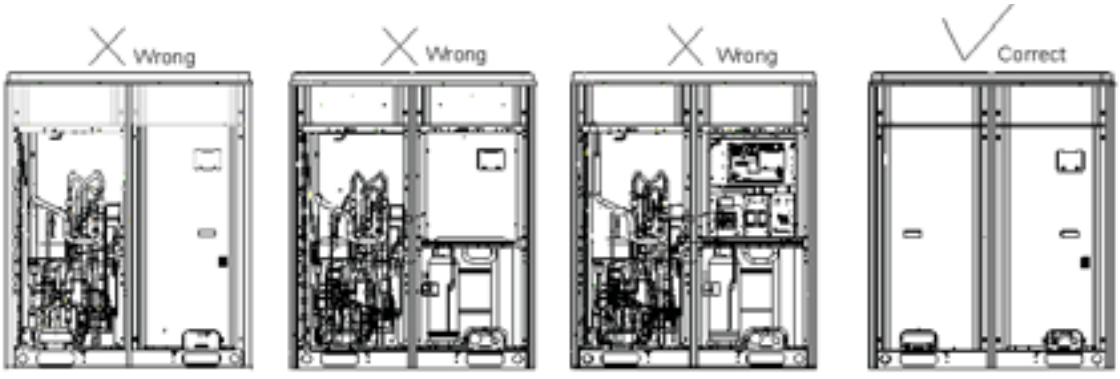


Fig.49

(5) Before debugging, make sure the appropriate amount of refrigerant has been added to the pipe (at least 70% of the required refrigerant must be added).

(6) Description of each stage of debugging stage:

Description of each stage of debugging progress				
——	Debugging code	Progress code	Status code	Meaning

Stage	LED1		LED2		LED3		
	Code	Display status	Code	Display status	Code	Display status	
01_ Set master unit	db	On	01	On	A0	On	System is not debugged.
	db	On	01	On	CC	On	Master unit hasn't been set. Please set it.
	db	On	01	On	CF	On	Master unit is two or more than two. Please reset.
	db	On	01	On	OC	On	Master unit has been set successfully. Next step will start automatically.
02_ Allocate addresses	db	On	02	On	Ad	Blink	System is allocating addresses.
	db	On	02	On	L7	Blink	No master indoor unit. Please the maser indoor unit. If master indoor unit is not set within 1min, the system will set it randomly.
	db	On	02	On	OC	On	Address allocation is finished. Next step will start automatically.
03_Confirm the quantity of module	db	On	03	On	01~04	Blink	LED3 displays the quantity of module. In this case, please confirm if the quantity is correct manually.
	db	On	03	On	OC	On	System has confirmed the quantity of module. Next step will start automatically.
04_Confirm the quantity of IDU	db	On	04	On	01~80	Blink	LED3 displays the quantity of IDU. In this case, please confirm if the quantity is correct manually.
	db	On	04	On	OC	On	System has confirmed the quantity of IDU. Next step will start automatically.
05_Internal communication detection	db	On	05	On	C2	On	Communication between master ODU and inverter compressor driver has error.
	db	On	05	On	C3	On	Communication between master ODU and inverter fan driver has error.
	db	On	05	On	CH	On	Rated capacity ratio between IDU and ODU is too high.
	db	On	05	On	CL	On	Rated capacity ratio between IDU and ODU is too low.
	db	On	05	On	OC	On	System detection is done. Next step will start automatically.
Description of each stage of debugging progress							
——	Debugging code		Progress code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	Code	Display status	Code	Display status	
06_Detect outdoor components	db	On	06	On	Related error code	On	System detects that outdoor components have error.
	db	On	06	On	OC	On	System detects no error on outdoor components. Next step will start automatically.
07_Detect indoor components	db	On	07	On	XXXX/ Related 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 displayed. For instance, if no.100 IDU has d5 error, then the LED3 will display circularly as below: 01(2s later), 00(2s later), d5.
	db	On	07	On	OC	On	System detects no error on indoor components. Next step will start automatically.
08_Confirm	db	On	08	On	U0	On	Preheat time for compressor is less than 8

preheated compressor							hours.
	db	On	08	On	OC	On	Compressor has been preheated for 8 hours. Next step will start automatically.
09_Refrigerant judgments before startup	db	On	09	On	U4	On	System is lack of refrigerant. System stops with balance equalizing pressure lower than 0.3Mpa.
	db	On	09	On	OC	On	Refrigerant is normal. Next step will start automatically.
10_Status judgments of outdoor valves before startup	db	On	10	On	ON	On	Outdoor valves are being inspected.
	db	On	10	On	U6	On	Outdoor valves are not fully opened.
	db	On	10	On	OC	On	Outdoor valves open normally.
11_Calculate refrigerant charging amount status manually	db	On	11	On	AE	On	The refrigerant charging amount status is in manual calculation status (additional refrigerant charging amount must be calculated correctly and recorded).
12_Confirm debugging startup	db	On	12	On	AP	Blink	Ready for units to start debugging.
	db	On	12	On	AE	On	The unit has been set in debugging operation status of manual calculation of refrigerant charging amount.
13_	——	——	——	——	——	——	No meaning.
14_	——	——	——	——	——	——	No meaning.
15_Cooling debugging	db	On	15	On	AC	On	Debugging for cooling mode. (Debugging operation mode, the system will select automatically with no need of manual setting).
	db	On	15	On	Related error code	On	Malfunction occurs when debugging for cooling mode.
	db	On	15	On	J0	On	Malfunction of other module occurs when debugging for cooling mode.
	db	On	15	On	U9	On	Pipeline or valve of outdoor unit is faulty.
	db	On	15	On	XXXX/U8	On	System detects error on indoor pipeline. XXXX means the project code of IDU with error. 3s later, U8 will be displayed. For instance, if no.100 IDU has U8 error, then the LED3 will display circularly as below: 01(2s later), 00(2s later), U8.
16_Heating debugging	db	On	16	On	AH	On	Debugging for heating mode. (Debugging operation mode, the system will select automatically with no need of manual setting).
	db	On	16	On	Related error code	On	Malfunction occurs when debugging for heating mode.
	db	On	16	On	J0	On	Malfunction of other module occurs when debugging for heating mode.
	db	On	16	On	U9	On	Pipeline or valve of outdoor unit is faulty.
	db	On	16	On	XXXX/U8	On	System detects error on indoor pipeline. XXXX means the project code of IDU with error. 3s later, U8 will be displayed. For instance, if no.100 IDU has U8 error, then the LED3 will display circularly as below: 01(2s later), 00(2s later), U8.

17_Debugging completion status	01~04	On	OF	On	OF	On	Debugging operation has been done and the unit is in standby status. LED1 displays module address. LED2 and LED3 display “OF”.

5.2.2.2 Debugging operation mode

V5 multi VRF system has two debugging modes: one is direct operation on main board of outdoor units while the other is PC operation via special software. In PC software debugging, indoor/outdoor parameters can be displayed and historical data can be recorded and queried. (Operation details can be found in software instruction manuals)

(1)Debugging through operation on main board of outdoor units

In this debugging mode, the following debugging functions are included on the main board:

Step 1: front panel of the outdoor units must be fully closed. Open the debugging window of each basic module;

Step 2: disconnect power for outdoor units. According to design requirements of external static pressure, set up corresponding static pressure mode for the units. Setting methods can be seen in Outdoor Fan Static Pressure Setup SA6_ESP_S;

Step 3: disconnect power for outdoor units and set one module as a master unit. Setting methods can be seen in Master Unit Setup SA8_MASTER_S;

Step 4: Connect power for all indoor units. Make sure all IDUs are power on. Then all outdoor modules will display “Debugging not enabled”;

Step 5: Find the module with “01” module address to be the master module. Hold SW7 button on the master module for at least 5s to enable debugging;

Step 6: Wait. Unit will then start stage 01 and 02; in stage 01, if master unit is not correctly set, stage 01 will show the following errors:

	Debugging Code		Progress Code		Status Code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	Code	Display status	Code	Display status	
01_01 Set up master unit:	db	light	01	light	CC	light	System doesn’t have master unit. Reset master unit.
	db	light	01	light	CF	light	More than 2 master units are set. Reset master unit.
	db	light	01	light	OC	light	Master unit is successfully set. Start next stage.

According to the above errors, reset the master unit as instructed in Master Unit Setup SA8_MASTER_S. After reset is finished, start debugging again.

In stage 02, if master IDU is not detected, then stage 02 will show the following errors:

LED1		LED2		LED3	
Function code	Display mode	Current stage	Display mode	Current status	Display mode
db	light	02	light	L7	blink

At this time, all buttons are ineffective. Set master IDU in 1min via debugging software. If

master IDU is not set in 1min, system will set up a master IDU randomly. Next, system will start next stage.

Step 7: in stage 03, the quantity of modules needs to be confirmed manually. Main board of each module will display:

	Debugging code		Stage code		Status code	
Stage	LED1		LED2		LED3	
	Code	Display status	Code	Display status	Code	Display status
03_Quantity of modules	db	light	03	light	Quantity of modules	blink

If the quantity displayed is the same with actual quantity, then press SW7 confirmation button on the master unit to confirm it. Unit will start next stage:

	Debugging code		Stage code		Status code	
Stage	LED1		LED2		LED3	
	Code	Display status	Code	Display status	Code	Display status
03_Confirm the quantity of modules	db	light	03	light	OC	light

If the quantity displayed is different from actual quantity, then disconnect power and check whether communication wire among each module is correctly connected. After the check, start debugging again.

Step 8: in stage 04, the quantity of IDUs needs to be confirmed manually. Main board of each module will display:

	Debugging code		Stage code		Status code	
Stage	LED1		LED2		LED3	
	Code	Display status	Code	Display status	Code	Display status
04_Confirm the quantity of IDUs	db	Light	04	Light	Quantity of connected IDUs	blink

If the quantity displayed is the same with actual quantity, then press SW7 confirmation button on the master unit to confirm it. Unit will start next stage:

	Debugging code		Stage code		Status code	
Stage	LED1		LED2		LED3	
	Code	Display status	Code	Display status	Code	Display status
04_Confirm the quantity of IDUs	db	Light	04	Light	OC	Light

Step 9: stage 05 is “Detect internal communication”

If no error is detected, system will display as below and then start next stage.

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
05_Detect internal communication	db	Light	05	Light	OC	Light	Detection is finished. Start next stage.

If error is detected, system will stay at current stage. Error has to be solved manually. Below are relevant errors:

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
05_Detect internal communication	db	Light	05	Light	C2	Light	System detects “driven communication error between master unit and inverter compressor”.
	db	Light	05	Light	C3	Light	System detects “driven communication error between master unit and inverter fan”.
	db	Light	05	Light	CH	Light	IDU/ODU “high proportion of rated capacity”.
	db	Light	05	Light	CL	Light	IDU/ODU “low proportion of rated capacity”.

Elimination methods of above errors can be found in Troubleshooting.

Step 10: stage 06 is “Detect outdoor components”

If no error is detected, system will display as below and then start next stage.

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
06_Detect outdoor components	db	Light	06	Light	OC	Light	No error is detected in outdoor components. Start next stage.

If error is detected, system will stay at current stage. Error has to be corrected manually. Below is relevant error:

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
06_Detect outdoor components	db	Light	06	Light	Error code	Light	System detects error in outdoor components.

Elimination methods of above error can be found in Troubleshooting.

Step11: stage 07 is “Detect indoor components”

If no error is detected, system will display as below and then start next stage.

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
07_Detect indoor components	db	Light	07	Light	OC	Light	No error is detected in indoor components. Start next stage.

If error is detected, system will stay at current stage. Error has to be corrected manually. Below is relevant error:

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
07_Detect indoor components	db	Light	07	Light	XXXX or Error code	Light	System detects error in indoor components.

XXXX is the project no. of the faulty IDU. 3s later, relevant error code is displayed. For example, IDU no. 100 has d5 error, then LED3 displays like this: 01 (2s later) 00 (2s later) d5, and repeat again.

Elimination methods of above error can be found in Troubleshooting.

Step 12: stage 08 is “Confirm preheated compressor”

If more than 8h of preheat time is detected, system will display as below and start next stage.

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
08_Confirm preheated compressor	db	Light	08	Light	OC	Light	Preheat time for compressor is 8h. Start next stage.

If less than 8h of preheat time is detected, system will give error alarm and display as below. You CAN press SW7 confirmation button to skip the wait time and start next stage, BUT this will force start the compressor, which may cause damage.

——	Debugging code	Stage code	Status code	Meaning
Stage	LED1	LED2	LED3	

	Code	Display status	code	Display status	Code	Display status	
08_Confirm preheated compressor	db	Light	08	Light	UO	Light	Preheat time for compressor is less than 8h.

Step 13: stage 09 is “Refrigerant check before startup”

If the refrigerant quantity meets the requirement of operation startup, system will display as below and start next stage.

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
09_Refrigerant check before startup	db	Light	09	Light	OC	Light	System refrigerant is normal. Start next stage.

If there’s not enough refrigerant in the system, system will display U4 “refrigerant shortage protection.” Check if there’s any leakage and add refrigerant until error eliminated.

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
09_Refrigerant judgments before startup	db	Light	09	Light	O4	Light	System refrigerant is low. System downtime equilibrium pressure is lower than 0.3MPa(4-2/5psig).

Step 14: stage 10 is “Status check of outdoor valves before startup”

If master unit displays below, status judgments are enabled.

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
10_Status check of outdoor valves before startup	db	Light	10	Light	ON	Light	Outdoor valves are being turned on.

If unit detects that valve status is not normal, it will display as below:

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
10_Status check of outdoor valves before startup	db	Light	10	Light	U6	Light	Outdoor valves are not fully turned on.

Then check the big and small valves whether they are fully turned on. After the check, press SW6 return button to restart the judgments.

If unit detects that valve status is normal, it will display as below and start next stage.

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
10_Status check of outdoor valves before startup	db	Light	10	Light	OC	Light	Outdoor valves are turned on normally.

Step 15: stage 11 is “Calculate refrigerant quantity manually”

No need to operate. System will start next stage.

Step 16: stage 12 is “Confirm debugging startup”

In order to make sure all preparation work is done before startup, this step is designed for user to confirm the startup again. Operate as below:

If master unit displays as below, system is waiting for confirmation signal.

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
12_Status check of outdoor valves before startup	db	Light	12	Light	AP	Blink	Ready for units to start debugging.

If it’s confirmed, press SW7 confirmation button. Unit will display as below and start next stage.

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
12_Status check of outdoor valves before startup	db	Light	12	Light	AE	Light	Manual calculation of refrigerant quantity is set up.

Step 17: after unit has started debugging, system select cooling/heating mode according to ambient temperature.

A If cooling mode is selected, display is as below:

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	

15_Cooling debugging	db	Light	15	Light	AC	Light	Debugging is enabled in cooling mode (debugging mode, automatically selected by system).
	db	Light	15	Light	Error code	Light	Error occurs during debugging in cooling mode.
	db	Light	15	Light	J0	Light	Error of other modules occurs during debugging in cooling mode.
	db	Light	15	Light	U9	Light	Outdoor pipeline and valves are not operating normally.
	db	Light	15	Light	XXXX /U8	Light	System detects error in indoor pipeline. XXXX is the project no. of the faulted IDU. 3s later, error code U8 is displayed. For example, IDU no. 100 has U8 error, then LED3 displays like this: 01 (2s later) 00 (2s later) U8, and repeat again.

B If heating mode is selected, relevant display is as below:

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
16_Heating debugging	db	Light	16	Light	AE	Light	Debugging is enabled in heating mode (debugging mode, automatically selected by system).
	db	Light	16	Light	Error code	Light	Error occurs during debugging in heating mode.
	db	Light	16	Light	J0	Light	Error of other modules occurs during debugging in heating mode.
	db	Light	16	Light	U9	Light	Outdoor pipeline and valves are not operating normally.
	db	Light	16	Light	XXXX /U8	Light	System detects error in indoor pipeline. XXXX is the project no. of the faulted IDU. 3s later, error code U8 is displayed. For example, IDU no. 100 has U8 error, then LED3 displays like this: 01 (2s later) 00 (2s later) U8, and repeat again.

Step 18: if there's no error during operation for about 40min, system will automatically confirm that debugging is finished and then stop. System resumes standby condition and displays as below:

——	Debugging code		Stage code		Status code		Meaning
Stage	LED1		LED2		LED3		
	Code	Display status	code	Display status	Code	Display status	
17_Debugging finished	01-04	Light	OF	Light	OF	Light	Debugging is finished. System is on standby condition. LED1 displays module address. LED2 and LED3 display "OF".

Step 19: after debugging is finished, some functions can be set up according to project needs.

For specific details, please refer to System Functions Setup. If no special requirements, skip this step.

Step 20: deliver the product to user and inform user about usage precautions.

5.2.3 Appendix: judgment reference of normal operational parameters

Reference of Debug Parameters of GMV5 DC Inverter Multi VRF System					
No.	Debug item		Parameter name	Unit	Reference
1	System parameters	ODU	Outdoor ambient temp	ºC(°F)	——
2			Discharge tube temp of inverter compressor 1	ºC(°F)	● When system compressor starts up, temp of discharge tube or casing top in cooling mode is within 70~95ºC (158~203°F), and at least 10 ºC (18°F) higher than system high pressure saturation temp; Temp in heating mode is within 65~80ºC (149~176°F), and at least 10ºC (18°F) higher than system high pressure saturation temp. ● When inverter compressor starts but inverter compressor 2 stops, the discharge tube temperature of inverter compressor 2 is almost the same as ambient temp.
3			Casing top temp of inverter compressor 1	ºC(°F)	
4			Discharge tube temp of inverter compressor 2	ºC(°F)	
5			Casing top temp of inverter compressor 2	ºC(°F)	
6			Defrost temp 1	ºC(°F)	● In cooling mode, defrost temp1 is 5~11ºC (5~19.8°F) lower than system high pressure value; ● In heating mode, defrost temp1 is about 2ºC (3.6°F) different from system low pressure value.
7			System high pressure	ºC(°F)	● System's normal high pressure value is within 20~25ºC (68~77°F) According to the change in ambient temp and system operational capacity, system's high pressure value is 10~40ºC (18~72°F) higher than ambient temp The higher ambient temp is, the smaller temp difference is. ● When ambient temp is 25~35ºC (77~95°F), system's high pressure value in cooling mode is 44~53ºC (111.2~127.4°F). ● When ambient temp is -5~10ºC (23~50°F), system's high pressure value in heating mode is 40~52ºC (104~125.6°F).
8			System low pressure	ºC(°F)	● When ambient temp is 25~35ºC(77~95°F), system's low pressure value in cooling mode is 0~8ºC(32~46.4°F). ● When ambient temp is -5~10ºC(23~50°F), system's low pressure value in heating mode is -15~5ºC(5~41°F).
9			Opening angle of heating EXV	PLS	● In cooling mode, heating electronic expansion valve remains 480PLS. ● In heating mode, the opening angle of adjustable electronic expansion valve varies within 120~480PLS.
10			Operating freq. of inverter compressor 1	Hz	Varies from 20Hz to 95Hz
11			Current of inverter compressor 1	A	According to different operating freq. and different load, current will vary from 7A to 40A.
12			IPM temp of inverter compressor 1	ºC(°F)	When ambient temp is lower than 35ºC(95°F), IPM temp is below 85ºC(185°F). Highest temp won't be

					above 95ºC(203°F).
13			Inverter compressor 1 driven bus voltage	V	Normal bus voltage is 1.414 times of power voltage. For example, if 3-phase power voltage is 220V, then the bus voltage after rectification is: 220V X 1.414=311V. It's normal if actual voltage varies 15v from the calculated voltage.
14			Operating freq. of inverter compressor 2	Hz	Varies from 30Hz to 100Hz
15			Current of inverter compressor 2	A	According to different operating freq. and different load, current will vary from 7A to 25A.
16			IPM temp of inverter compressor 2	ºC(°F)	When ambient temp is lower than 35ºC(95°F), IPM temp is below 80ºC(176°F). Highest temp won't be above 95ºC(203°F).
17			Inverter compressor 2 driven bus voltage	V	Normal bus voltage is 1.414 times of power voltage. For example, if 3-phase power voltage is 220V , then the bus voltage after rectification is: 220V X 1.414=311V. It's normal if actual voltage varies 15v from the calculated voltage.

Reference of Debug Parameters of V5 DC Inverter Multi VRF System					
No.	Debug item		Parameter name	Unit	Reference
18	System parameters	ODU	Operating freq of fan motor 1	Hz	Adjusts in 0~65Hz according to system pressure.
19			Current of fan motor 1	A	
20			Operating freq of fan motor 2	Hz	Adjusts in 0~65Hz according to system pressure.
21			Current of fan motor 2	A	
22		IDU	Ambient temp of IDU	ºC(°F)	——
23			Inlet tube temp of indoor heat exchanger	ºC(°F)	● According to different ambient temp, for a same IDU under cooling mode, inlet tube temp will be 1~7ºC (1.8~12.6°F) lower than outlet tube temp. ● For a same IDU under heating mode, inlet tube temp will be 10~20ºC (18~36°F) lower than outlet tube temp.
24			Outlet tube temp of indoor heat exchanger	ºC(°F)	
25			Opening angle of indoor EXV	PLS	Adjusts opening angle automatically in 200~2000PLS.
26	Communi -cation parameter	Communication data		—	Quantity of IDU and ODU detected by software is the same with actual quantity. No communication error.
27	Drainage system	——		—	IDU can drain water out completely and smoothly. Condensate pipe has no backward slope. Water of ODU can be drained completely through drainage pipe. No water dripping from unit base.
28	Others	——		ºC(°F)	Compressor and indoor/outdoor fan motor has no strange noise. Unit operates normally.

6 Common Malfunction and Troubleshooting

Check the following items before contacting for repair.

Phenomenon	Reason	Measure
The unit doesn't run.	No power supply connected	Connect to power supply
	Voltage is too low	Check if the voltage is within rating range
	Broken fuse or breaker trips off	Replace fuse or flip breaker switch
	No signal from remote controller	Replace battery
	Remote controller is out of control scope	Move remote to within 8m (26 feet)
Unit runs but stop immediately	Air intake or outlet of indoor or outdoor unit is blocked	Remove obstruction
Abnormal cooling or heating	Air intake or outlet of indoor or outdoor unit is blocked	Remove obstruction
	Improper temperature setting	Adjust setting at wireless remote controller or wired controller
	Fan speed is set too low	Adjust setting at wireless remote controller or wired controller
	Wind direction is not correct	Adjust setting at wireless remote controller or wired controller
	Door or windows are opened	Close the door or windows
	Direct sunshine	Draw curtain or louver
	Too many people in the room	
	Too many heat resources in the room	Reduce heat resources
	Filter is blocked for dirt	Clean the filter

NOTICE

(1) When installing remote monitor or central controller, transition on indoor units' project codes must be made. Otherwise, there will be confusion of the project codes. For detail operation methods, please refer to the V5 Installation and Maintenance Manual.

(2) If problem cannot be solved after checking the above items, please contact a qualified technician.

Following circumstance are not malfunction.

"Malfunction"		Reason
Unit doesn't run	When unit is started immediately after it is just turned off	Overload protection switch requires a 3 minutes delay
	When power is turned on	Standby operating for about 1 minute
Mist comes from the unit	Under cooling	Indoor high humidity air is cooled rapidly
Noise is emitted	Slight cracking sound is heard when just turned on	It is noise when electronic expansion valve initialization
	There is repeated sound when cooling	That's sound of gas refrigerant flowing in unit

	There is sound when unit starts or stops	That's sound of gas refrigerant flow stopping
	There is slight and continuous sound when unit is running or after running	That's sound of the drainage system
	Cracking sound is heard when unit is operating and after turning off	That’s sound caused by expansion of panel and other parts due to temperature change
The unit blows out dust	When unit runs after a period of inactivity	Dust in indoor unit is blown out
The unit emits odor	Operating	The room odor absorbed by the unit is recirculated
Indoor unit still runs after switch off	After every indoor unit receive "stop" signal, fan will keep running	Indoor fan motor will keep running 20-70s so as to take advantage of excess cooling and heating and prepare for the next operation
Mode conflict	COOL or HEAT mode cannot be operated	When the indoor operating mode conflicts with that of outdoor unit, indoor fault indicator will flash and conflict will be shown on the wired controller after 5 minutes. Indoor unit stops. Outdoor operating mode changes to the same as that of indoor unit, then the unit will go back to normal. COOL mode doesn't conflict with DRY mode. FAN mode doesn't conflict with any mode.

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 together means over-current protection.

Division symbol \ Content symbol		0	1	2	3	4	5
Indoor	L	Malfunction of IDU	Protection of indoor fan	Auxiliary heating protection	Water-full protection	Abnormal power supply for wired controller	Freeze prevention protection
	d		Indoor PCB is poor	Malfunction of lower water temperature sensor of water tank	Malfunction of ambient temperature sensor	Malfunction of entry-tube temperature sensor	
Outdoor	E	Malfunction of ODU	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	Protection for other modules	Over-current protection of compressor 1	Over-current protection of compressor 2	Over-current protection of compressor 3	Over-current protection of compressor 4	Over-current protection of compressor 5
	b		Malfunction of outdoor ambient temperature sensor	Malfunction of defrosting temperature sensor 1	Malfunction of defrosting temperature sensor 2	Malfunction of liquid temperature sensor of sub-cooler	Malfunction of gas temperature sensor of sub-cooler
	P	malfunction of driving board of compressor	Driving board of compressor operates abnormally	Voltage protection of driving board power of compressor	Reset protection of driving module of compressor	Drive PFC protection of compressor	Over-current protection of inverter compressor
	H	Malfunction of driving board of fan	Driving board of fan operates abnormally	Voltage protection of driving board power of fan	Reset protection of driving module of fan	Drive PFC protection of fan	Over-current protection of inverter fan
Debugging	U	Preheat time of compressor is insufficient		Wrong setting of ODU's capacity code/jumper cap	Power supply phase sequence protection	Refrigerant-lacking protection	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	Communication malfunction between main control and inverter fan driver	Malfunction of lack of IDU	Alarm because project code of IDU is inconsistent

Division symbol \ Content symbol		0	1	2	3	4	5
Status	A	Unit waiting for debugging		Refrigerant recovery operation of after-sales	Defrosting	Oil-return	
	n	SE operation setting of system			Compulsory defrosting	Limit setting for max. capacity/output capacity	Compulsory excursion of engineering code of IDU

Division symbol \ Content symbol		6	7	8	9	A	H
Indoor	L		No main IDU	Power supply is insufficient	For single control over multiple units, number of IDU is inconsistent	For single control over multiple units, IDU series is inconsistent	Alarm due to bad air quality
	d	Malfunction of exit-tube temperature sensor	Malfunction of humidity sensor	Malfunction of water temperature sensor	Malfunction of jumper cap	Web address of IDU is abnormal	PCB of wired controller is abnormal
Outdoor	E						
	F	Malfunction of discharge temperature sensor of compressor 2	Malfunction of discharge temperature sensor of compressor 3	Malfunction of discharge temperature sensor of compressor 4	Malfunction of discharge temperature sensor of compressor 5	Malfunction of discharge temperature sensor of compressor 6	Current sensor of compressor 1 is abnormal
	J	Over-current protection for compressor 6	Gas-mixing protection of 4-way valve	High pressure ratio protection of system	Low pressure ratio protection of system	Protection because of abnormal pressure	
	b	Malfunction of inlet tube temperature sensor of vapor liquid separator	Malfunction of exit tube temperature sensor of vapor liquid separator	Malfunction of outdoor humidity sensor	Malfunction of gas temperature sensor of heat exchanger	Malfunction of oil-return temperature sensor 1	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	Malfunction of drive storage chip of compressor	High-voltage protection of compressor's drive DC bus bar
	H	Drive IPM module protection of fan	Malfunction of drive temperature sensor of fan	Drive IPM high temperature protection of fan	Desynchronizing protection of inverter fan	Malfunction of drive storage chip of inverter outdoor fan	High-voltage protection of fan's drive DC bus bar
Debugging	U	Alarm because valve is abnormal		Malfunction of pipeline for IDU	Malfunction of pipeline for ODU		
	C	Alarm because ODU quantity is inconsistent	Abnormal communication of converter	Emergency status of compressor	Emergency status of fan	Emergency status of module	Rated capacity is too high
Status	A	Heat pump function	Quiet mode setting	Vacuum pump mode			Heating

Content symbol / Division symbol		6	7	8	9	A	H
		setting					
	n	Inquiry of malfunction	Inquiry of parameters	Inquiry of project code of IDU	Check quantity of IDU on line	Heat pump unit	Heating only unit

Content symbol / Division symbol		C	L	E	F	J	P
Indoor	L	IDU is not matching with outdoor unit	Malfunction of water flow switch	Rotation speed of EC DC water pump is abnormal	Malfunction of shunt valve setting	Setting of functional DIP switch code is wrong	Zero-crossing malfunction of PG motor
	d	Setting capacity of DIP switch code is abnormal	Malfunction of air outlet temperature sensor	Malfunction of indoor CO2 sensor	Malfunction of upper water temperature sensor of water tank	Malfunction of backwater temperature sensor	Malfunction of inlet tube temperature sensor of generator
Outdoor	E						
	F	Current sensor of compressor 2 is abnormal	Current sensor of compressor 3 is abnormal	Current sensor of compressor 4 is abnormal	Current sensor of compressor 5 is abnormal	Current sensor of compressor 6 is abnormal	Malfunction of DC motor
	J	Water flow switch protection	Protection because high pressure is too low	Oil-return pipe is blocked	Oil-return pipe is leaking		
	b	Protection because the temperature sensor at the top of compressor 1 is loose	Protection because the temperature sensor at the top of compressor 2 is loose	Malfunction of inlet tube temperature sensor of condenser	Malfunction of outlet tube temperature sensor of condenser	High-pressure sensor and low-pressure sensor are connected reversely	Malfunction of temperature sensor of oil-return 2
	P	Malfunction of current detection circuit drive of compressor	Low voltage protection for DC bus bar of drive of compressor	Phase-lacking of inverter compressor	Malfunction of charging loop of driven of compressor	Failure startup of inverter compressor	AC current protection of inverter compressor
	H	Malfunction of current detection circuit of fan drive	Low voltage protection of bus bar of fan drive	Phase-lacking of inverter fan	Malfunction of charging loop of fan drive	Failure startup of inverter fan	AC current protection of inverter fan
Debugging	U	Setting of main IDU is succeeded	Emergency operation DIP switch code of compressor is wrong	Charging of refrigerant is invalid	Identification malfunction of IDU of mode exchanger		
	C	No main unit	The matching ratio of rated capacity for IDU and	Communication malfunction between mode exchanger and IDU	Malfunction of multiple main control units	Address DIP switch code of system is shocking	Malfunction of multiple wired controller

			ODU is too low				
Status	A	Cooling	Charge refrigerant automatically	Charge refrigerant manually	Fan	Cleaning reminding of filter	Debugging confirmation when starting up the unit
	n	Cooling only unit		Negative code	Fan model	High temperature prevention when heating	

Division symbol \ Content symbol		U	b	d	n	y
Indoor	L	Indoor unit's branch is not inconsistent for one-to-more unit of heat recovery system				
	d	Malfunction of drainage pipe temperature sensor of generator	Debugging status	Malfunction of solar power temperature sensor	Malfunction of swing parts	
Outdoor	E					
	F	Malfunction of casing top temperature sensor of compressor 1	Malfunction of casing top temperature sensor of compressor 2	Malfunction of exit tube temperature sensor of mode exchanger	Malfunction of inlet tube temperature sensor of mode exchanger	
	J					
	b	Malfunction of temperature sensor of oil return 3	Malfunction of temperature sensor of oil return 4			
	P	AC input voltage of drive of inverter compressor				
	H	AC input voltage of drive of inverter fan				
Debugging	U					
	C	Communication malfunction between IDU and the receiving lamp	Overflow distribution of IP address	Communication malfunction between mode exchanger and ODU	Malfunction of network for IDU and ODU of mode exchanger	Communication malfunction of mode exchanger
Status	A	Long-distance emergency stop	Emergency stop of operation	Limit operation	Child lock status	Shielding status
	n	Eliminate the long-distance shielding command of IDU	Bar code inquiry		Length modification of connection pipe of ODU	

Note: For detailed malfunction and maintenance, please refer to the engineering debugging and after-sales maintenance manual.

8 Maintenance and Care

Maintenance and care should be performed every six months by professional personnel, which will prolong the unit life span. Disconnect the power supply before cleaning and maintenance.

8.1 Outdoor Heat Exchanger

Outdoor heat exchanger is required to be cleaned once every six months. Use vacuum cleaner with nylon brush to clean up dust and sundries on the surface of heat exchanger. Blow away dust by compressed air if it is available. Never use water to wash the heat exchanger.

8.2 Drain Pipe

Regularly check if the drain pipe is clogged in order to drain condensate smoothly.

8.3 Check before Seasonal Use

(1) Check if the inlet/outlet of the indoor/outdoor unit is clogged.

(2) Check if the ground wire is secured reliably.

(3) Check if battery of remote wireless controller needs to be replaced.

(4) Check if the filter screen has been set securely.

(5) After long period of shutdown, turn on main power 8 hours before startup to preheat the compressor crankcase.

(6) Check if the outdoor unit is installed securely. If service is required, contact a qualified technician.

8.4 Maintenance after Seasonal Use

(1) Cut off main power supply of the unit.

(2) Clean filter screen and indoor and outdoor units.

(3) Clean the dust and debris on the indoor and outdoor units.

(4) In the event of rusting, use the anti-rust paint to keep it from spreading.

8.5 Parts Replacement

Purchase parts from an authorized dealer if necessary.

Note:

During airtight and leakage test, never mix oxygen, ethylene or other dangerous gas into refrigeration circuit. In case of hazard, it's better to use nitrogen or refrigerant for testing.

9 After-sales Service

In case the air-conditioning unit you bought has any quality problem or you have any inquiry, please contact the installing technician.

Warranty should meet the following requirements:

(1) Startup of the unit should be performed by a qualified technician.

(2) Only approved accessories can be used on the machine.

(3) All the instructions listed in this manual should be followed.

(4) Warranty will be automatically invalid if these conditions are not met.

Specifications & illustrations subject to change without notice or incurring obligations.

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