GREE
Change for life

Owner's Manual

Original Instructions

DC Inverter Multi VRF System

Models:

GMV-V36WL/NhC-T(U)

GMV-V48WL/NhC-T(U)

GMV-V60WL/NhC-T(U)

Thank you for choosing this product. Please read this Owner's Manual carefully before operation and retain it for future reference.

If you have lost the Owner's Manual, please contact the local agent or visit www.gree.com or send an email to global@cn.gree.com for the electronic version.

GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI

Preface

For correct installation and operation, please read all instructions carefully. Before reading the instructions, please be aware of the following items:

⚠WARNING
(1) The design standard of multi VRF system conforms to related standard of sales countries.
(2) To ensure safety when operating this system, please strictly follow the instructions in this manual.
(3) The total capacity of running indoor units must not exceed that of the outdoor units. Otherwise, the cooling (heating) effect of each IDU would be poor.
(4) Make sure that this manual is kept by direct operators and maintainers.
(5) If the product needs to be installed, moved or maintained, please contact our designated dealer or local service center for professional support. Users should not disassemble or maintain the unit by themselves, otherwise it may cause relative damage, and our company will bear no responsibilities.
(6) All the illustrations and information in the instruction manual are only for reference. In order to make the product better, we will continuously conduct improvement and innovation. If there is adjustment in the product, please subject to actual product.
(7) Under the standby status, the unit will consume a little power for ensuring reliability of the complete unit, maintaining normal communication and preheating refrigerant. When the unit won't be used for a long time, please cut off the power of the complete unit. However, please preheat it when operating the unit next time.

User Notice

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

DISPOSAL: Do not dispose this product as unsorted municipal waste. Collection of such waste separately for special treatment is necessary.

Exception Clauses
Manufacturer will bear no responsibilities when personal injury or property loss is caused by the following reasons:
(1) Damage the product due to improper use or misuse of the product.
(2) Alter, change, maintain or use the product with other equipment without abiding by the instruction manual of manufacturer.
(3) After verification, the defect of product is directly caused by corrosive gas.
(4) After verification, defects are due to improper operation during transportation of product.
(5) Operate, repair, maintain the unit without abiding by instruction manual or related regulations.
(6) After verification, the problem or dispute is caused by the quality specification or performance of parts and components that produced by other manufacturers.
(7) The damage is caused by natural calamities, bad using environment or force majeure.

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1 Safety Notices (Please be sure to abide them)

⚠ DANGER	If not abide them strictly, it may cause severe damage to the unit or the people.
⚠WARNING	If not abide them strictly, it may cause slight or medium damage to the unit or the people.
⚠CAUTION	This sign indicates that the items must be prohibited. Improper operation may cause severe damage or death to people.
NOTICE	This sign indicates that the items must be observed. Improper operation may cause damage to people or property.
	Appliance filled with flammable gas R32.
	Before install the appliance, read the installation manual first.
	Before use the appliance, read the owner's manual first.
	Before repair the appliance, read the service manual first.

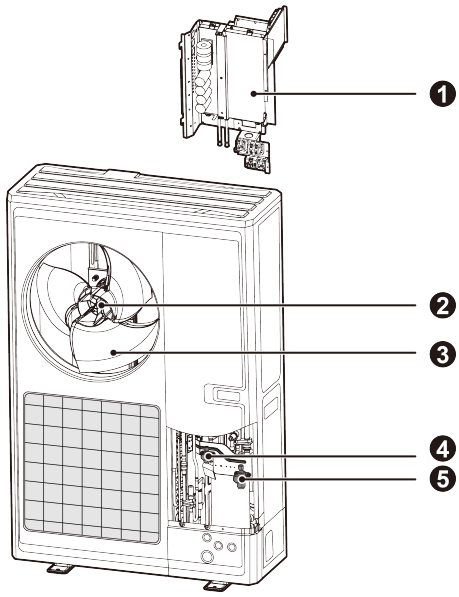
⚠WARNING	
(1)	This product can't be installed at corrosive, inflammable or explosive environment or the place with special requirements, such as kitchen. Otherwise, it will affect the normal operation or shorten the service life of the unit, or even cause fire hazard or serious injury. As for above special places, please adopt special air conditioner with anti-corrosive or anti-explosion function.
(2)	Follow this instruction to complete the installation work. Please carefully read this manual before unit startup and service.
(3)	Wire size of power cord should be large enough. The damaged power cord and connection wire should be replaced by exclusive cable.
(4)	After connecting the power cord, please fix the electric box cover properly in order to avoid accident.
(5)	Never fail to comply with the nitrogen charge requirements. Charge nitrogen when welding pipes.
(6)	Never short-circuit or cancel the pressure switch to prevent unit damage.
(7)	Please firstly connect the wired controller before energization, otherwise wired controller can not be used.
(8)	Before using the unit, please check if the piping and wiring are correct to avoid water leakage, refrigerant leakage, electric shock, or fire etc.
(9)	Do not insert fingers or objects into air outlet/inlet grille.
(10)	Open the door and window and keep good ventilation in the room to avoid oxygen deficit when the gas/oil supplied heating equipment is used.
(11)	Never start up or shut off the air conditioner by means of directly plug or unplug the power cord.
(12)	Turn off the unit after it runs at least five minutes; otherwise it will influence oil return of the compressor.
(13)	Do not allow children operate this unit.
(14)	Do not operate this unit with wet hands.
(15)	Turn off the unit or cut off the power supply before cleaning the unit, otherwise electric shock or injury may happen.
(16)	Never spray or flush water towards unit, otherwise malfunction or electric shock may happen.
(17)	Do not expose the unit to the moist or corrosive circumstances.
(18)	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).
(19)	User is not allowed to repair the unit. Fault service may cause electric shock or fire accidents. Please contact our designated dealer or local service center for help.
(20)	Before installation, please check if the power supply is in accordance with the requirements specified on the nameplate. And also take care of the power safety.
(21)	Installation should be conducted by dealer or qualified personnel. Please do not attempt to install the unit by yourself. Improper handling may result in water leakage, electric shock or fire disaster etc.
(22)	Be sure to use the exclusive accessory and part to prevent the water leakage, electric shock and fire accidents.

⚠ WARNING
(23) Make sure the unit can be earthed properly and soundly after plugging into the socket so as to avoid electric shock. Please do not connect the ground wire to gas pipe, water pipe, lightning rod or telephone line.
(24) Electrify the unit 8 hours before operation. Please switch on for 8 hours before operation. Do not cut off the power when 24 hours short-time halting (to protect the compressor).
(25) If refrigerant leakage happens during installation, please ventilate immediately. Poisonous gas will emerge if the refrigerant gas meets fire.
(26) Volatile liquid, such as diluent or gas will damage the unit appearance. Only use soft cloth with a little neutral detergent to clean the outer casing of unit.
(27) If anything abnormal happens (such as burning smell), please power off the unit and cut off the main power supply, and then immediately contact our designated dealer or local service center. If abnormality keeps going, the unit might be damaged and lead to electric shock or fire.
(28) This unit is equipped with a refrigerant leak detector for safety. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.
(29) Ducts connected to an appliance shall not contain a potential ignition source.
(30) Keep any required ventilation openings clear of obstruction.
(31) Precautions shall be taken to avoid excessive vibration or pulsation to refrigerating piping.
(32) Protection devices, piping and fittings shall be protected as far as possible against adverse environmental effects, for example, the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris.
(33) Provision shall be made for expansion and contraction of long runs of piping.
(34) Piping in refrigerating systems shall be so designed and installed to minimize the likelihood hydraulic shock damaging the system.
(35) Electromagnetic valves should be correctly installed in the pipeline to avoid hydraulic shock, and must not block the liquid refrigerant unless sufficient pressure relief is provided.
(36) Steel pipes and components shall be protected against corrosion with a rustproof coating before applying any insulation.
(37) Only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork.
(38) Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
(39) The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).
(40) Do not pierce or burn.
(41) Be aware that refrigerants may not contain an odour.

If the product needs to be installed, moved or maintained, please contact our designated dealer or local service center for professional support, otherwise our company would bear no legal reliability for the related damages arising therefrom.

2 Product Introduction

2.1 Names of Main Parts



❶ Electric box assembly
❷ Motor
❸ Fan blade
❹ Liquid pipe valve
❺ Gas pipe valve

Fig.2.1.1

2.2 Combinations of Indoor and Outdoor Units

(1) See below the number of indoor units that can be connected to the outdoor unit.

(2) The total capacity of indoor units should be within 50%~135% of that of the outdoor unit.

Model	Max Sets of Connectable IDUS
GMV-V36WL/NhC-T(U)	7
GMV-V48WL/NhC-T(U)	8
GMV-V60WL/NhC-T(U)	10

(3) Can be connected to various indoor units. When any one of the indoor units receives operating command, outdoor unit will start operation as per required capacity. When all indoor units stop, outdoor unit will be shut off.

2.3 Operating Range

Cooling	Outdoor temperature: -5~54°C(23~129°F)
Heating	Outdoor temperature: -30~27°C(-22~81°F)

2.4 Minimum Room Area

See the instruction manual for the indoor unit.

2.5 Calculation Method of Releasable Charge (m_{REL})

The outdoor unit is equipped with automatic refrigerant cut-off valves. When the indoor unit detects refrigerant leakage, the cut-off valves will cut off the refrigerant of the outdoor unit. The releasable charge (m_{REL}) refers to the total amount of refrigerant remaining in all indoor units and pipeline that may leak into the room.

m_{REL} =m1 of all indoor units in the system + m2 of all pipeline in the system + 0.204kg(0.45LBS)

If the calculated m_{REL} is larger than the system refrigerant amount (including the default refrigerant of outdoor unit and the additional refrigerant charge), the system refrigerant amount

should be used as m_{REL}.

m1 of different indoor unit must refer to corresponding Owner's Manual of indoor unit.

All pipelines in the system are divided into three types A/B/C according to pipe dimension. Count the total pipe length of each type and find out m2 of corresponding type in the table below. Add up all m2 of each type to obtain the m2 of the system.

m2 of pipeline:w

Unit: kg(LBS)

Pipe Type		A	B	C
Gas Pipe mm (inch)		15.9 (5/8)	12.7 (1/2)	9.52 (3/8)
Liquid Pipe mm (inch)		9.52 (3/8)	6.35 (1/4)	6.35 (1/4)
Total Pipe Length m (feet)	5 (16-3/8)	0.27(0.59)	0.11(0.24)	0.10(0.22)
	10 (32-13/16)	0.54(1.19)	0.22(0.48)	0.20(0.44)
	15 (49-3/16)	0.80(1.76)	0.33(0.72)	0.29(0.63)
	20 (65-5/8)	1.07(2.35)	0.43(0.94)	0.39(0.86)
	25 (82)	1.33(2.93)	0.54(1.19)	0.49(1.08)
	30 (98-7/16)	1.60(3.52)	0.65(1.43)	0.58(1.27)
	35 (114-13/16)	1.87(4.12)	0.75(1.65)	0.68(1.49)
	40 (131-1/4)	2.13(4.69)	0.86(1.89)	0.78(1.72)
	45 (147-5/8)	2.40(5.29)	0.97(2.13)	0.87(1.91)
	50 (164-1/16)	2.66(5.86)	1.07(2.35)	0.97(2.13)
	55 (180-7/16)	2.93(6.45)	1.18(2.60)	1.07(2.35)
	60 (196-7/8)	3.20(7.05)	1.29(2.84)	1.16(2.55)
	65 (213-1/4)	3.46(7.62)	1.39(3.06)	1.26(2.77)
	70 (229-11/16)	3.73(8.22)	1.50(3.30)	1.36(2.99)
	75 (246-1/16)	3.99(8.79)	1.61(3.54)	1.45(3.19)
	80 (262-7/16)	4.26(9.39)	1.71(3.76)	1.55(3.41)
	85 (278-7/8)	4.53(9.98)	1.82(4.01)	1.65(3.63)
	90 (295-1/4)	4.79(10.56)	1.93(4.25)	1.74(3.83)
	95 (311-11/16)	5.06(11.15)	2.03(4.47)	1.84(4.05)
	100 (328-1/16)	5.32(11.72)	2.14(4.71)	1.93(4.25)

For example:

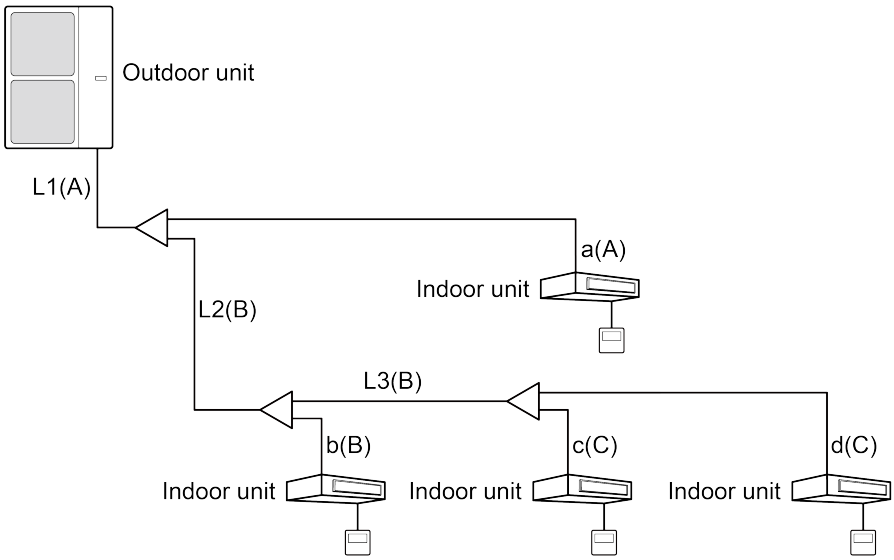


Fig.2.5.1

There are four indoor units in the system:

GMV-ND24PHS/NhD-T(U)*1 and GMV-ND12PHS/NhD-T(U)*3.

The total length of type A pipeline L1+a is 20m. m2 of type A is 1.07kg(2.35LBS).

The total length of type B pipeline L2+L3+b is 30m. m2 of type B is 0.65kg(1.43LBS).

The total length of type C pipeline c+d is 10m. m2 of type C is 0.20kg(0.44LBS).

The system refrigerant amount is 7kg(15.43LBS).

The releasable charge (m_{REL}) should be calculated as below:

m1=0.49+0.49*3=1.96kg(4.32LBS)

m2=1.07+0.65+0.20=1.92kg(4.23LBS)

m_{REL}=1.96kg(4.32LBS)+1.92kg(4.23LBS)+0.204kg(0.45LBS)=4.08kg(9.0LBS)

For 3 meters high room, the room area must not less than 13.1m²(140.8ft²). If the room area is less than 13.1m²(145.4ft²), measures need to be taken to make the room area meet the requirements, such as changing the piping design of the system to reduce the m_{REL}.

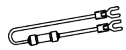
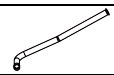
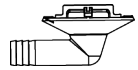
3 Preparation before Installation

NOTICE

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

3.1 Standard Parts

Please use the supplied standard parts as required.

Parts for Outdoor Unit				
No.	Name	Appearance	Qty	Remark
1	User Manual		1	—
2	Wiring (match with resistance)		1	Must be connected to the last IDU of communication connection
3	Liquid side connection pipe		1	—
4	Gas side connection pipe		1	—
5	Chassis gluey plug		3	—
6	Drainage joint		1	—
7	Information confirmation table for engineering installation	—	1	—

3.2 Installation Site

⚠WARNING	
(1)	The unit must be installed where strong enough to withstand the weight of the unit and fixed securely, otherwise the unit would topple or fall off.
(2)	Do not install where there is a danger of combustible gas leakage.
(3)	Do not install the unit near heat source, steam, or flammable gas.
(4)	Children under 10 years old must be supervised not to operate the unit.

⚠WARNING	
(5)	Select a location which is out of children's reach. Keep the unit away from children.
(6)	Make sure the location has space for heat exchange and maintenance so that unit can operate reliably with good ventilation.
(7)	Make sure the location has space for heat exchange and maintenance so that unit can operate reliably with good ventilation.
(8)	Install the unit where it will not be tilted by more than 5°.
(9)	During installation, if the outdoor unit has to be exposed to strong wind, it must be fixed securely.
NOTICE	
(1)	If possible, do not install the unit where it will be exposed to direct sunlight (If necessary, install a blind that does not interfere with the air flow).
(2)	Install ODU in a place where it will be free from getting dirty or getting wet by rain as much as possible.
(3)	Install ODU where it is convenient to connect IDU.
(4)	ODU and IDU should stay as close as possible to shorten the length of refrigerant pipe and reduce bend angles.
(5)	Install ODU where the condensate water can be drained out freely during heating operation. Do not place animals and plants in the path of the warm air.
(6)	Take the air conditioner weight into account and select a place where noise and vibration are small.

If the ODU is totally surrounded by walls, please refer to the following figure for space dimension:

Unit: mm(inch)

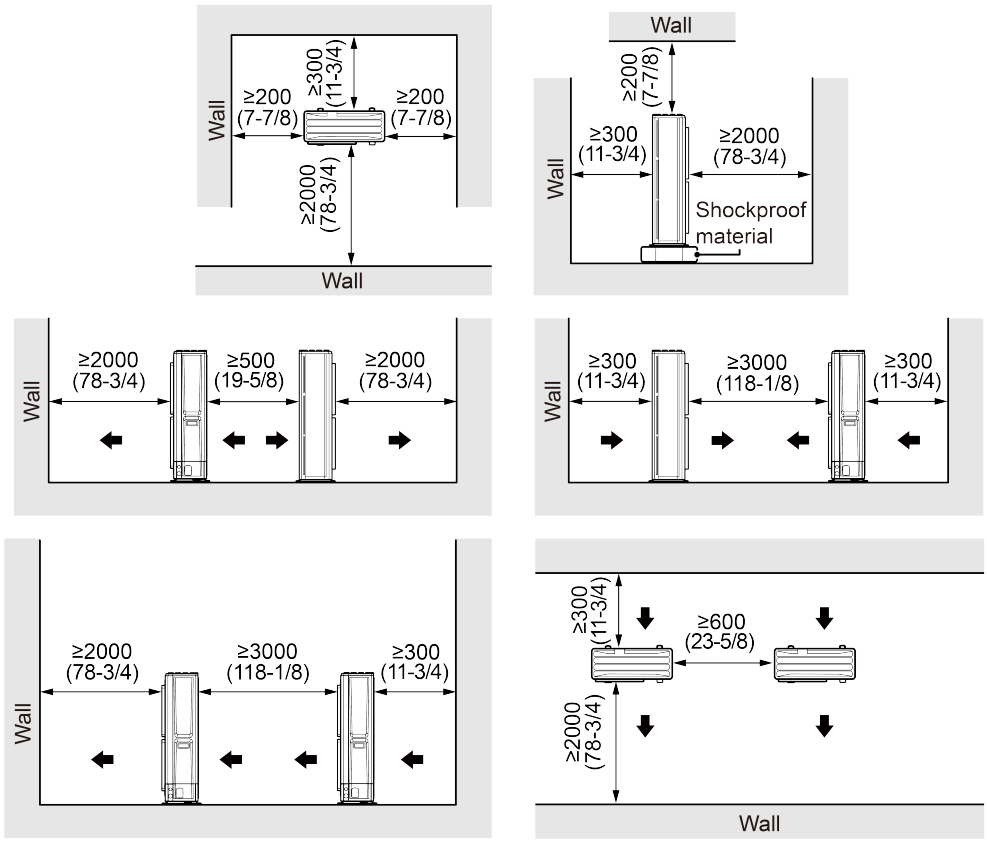


Fig.3.2.1

3.3 Installation Requirements for Cold and Snowy Areas

(1) Selection of installation position

1) Select a position where the snow will not affect the normal operation of the unit.

2) Select a position where the wind will not directly blow the air inlet and the air outlet.

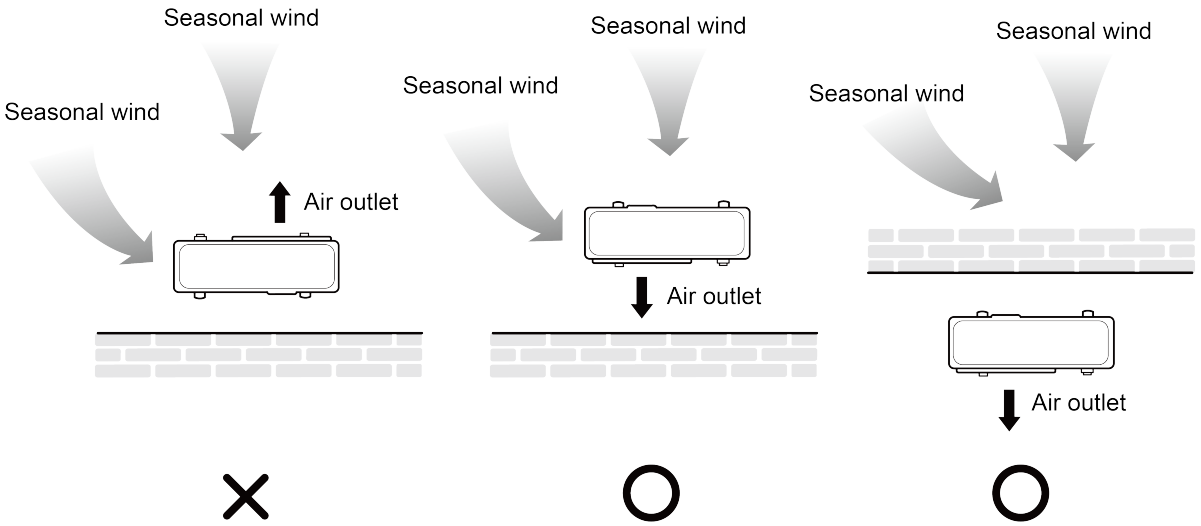


Fig.3.3.1

(2) Requirements for the installation base

1) The maximum snowfall should be considered for the height of the installation base. The height of the base should be 500mm(19-11/16inch) higher than the biggest predicted snowfall to prevent the snow covering the bottom part of the unit.

Unit: mm(inch)

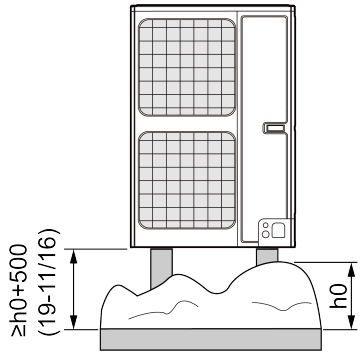


Fig.3.3.2

2) As for the severe cold areas, please adopt longitudinal base to avoid blocking the water drainage of chassis due to ice and snow accumulation.

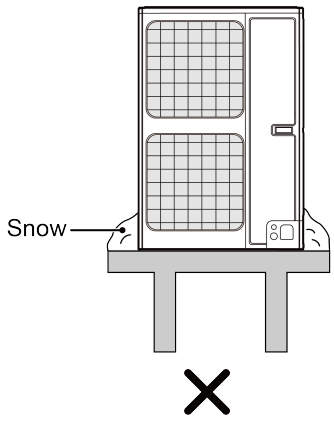


Fig.3.3.3 Ice and snow accumulation affects heat exchange

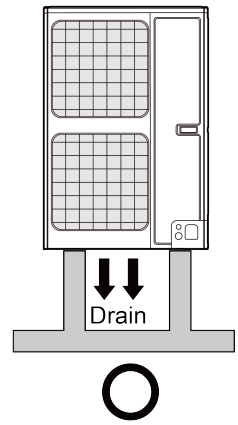


Fig.3.3.4 Smooth water drainage

(3) Installation of protective device

1) If there may be lateral snowfall may occur, you are suggested to install a lateral sunshade to ensure the normal operation of heat exchanger.

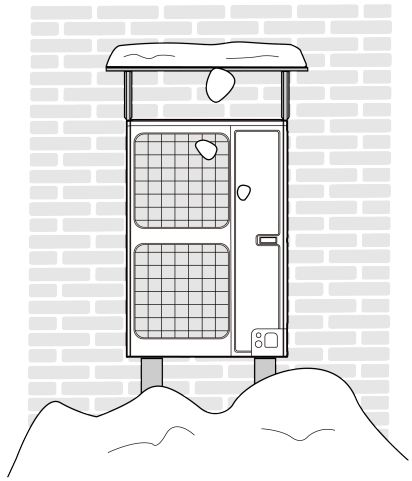


Fig.3.3.5

2) Please install a damper at the air-return side and on the top of the outdoor unit to avoid the outdoor unit exposing to wind and snow.

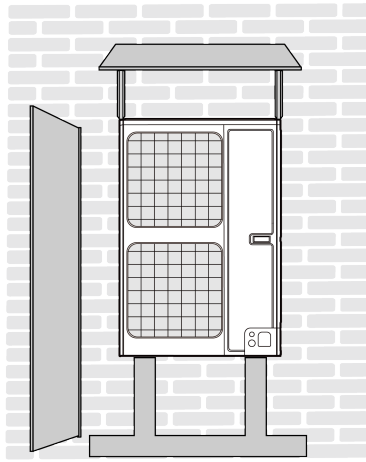


Fig.3.3.6

(4) If the unit is installed at the place with heavy snowfall, please remove the air-in grille to prevent snow accumulation on the fins.

(5) Prohibit adopting the centralized drainage installation for severe cold or snowy areas; otherwise, the drainage pipe and the chassis may be iced. If it's unavoidable, please adopt corresponding measures to prevent the ice blockage for the centralized drainage pipe, such as adding electric heater for the drainage pipe.

3.4 Piping Work Requirements

Refer to the table below for piping work requirements:

R32 Refrigerant System	
Outer diameter (mm/inch)	Wall thickness (mm/inch)
Φ6.35(Φ1/4)	≥0.8(1/32)
Φ9.52(Φ3/8)	≥0.8(1/32)

R32 Refrigerant System	
Outer diameter (mm/inch)	Wall thickness (mm/inch)
Φ12.7(Φ1/2)	≥0.8(1/32)
Φ15.9(Φ5/8)	≥1.0(1/25)
Φ19.05(Φ3/4)	≥1.0(1/25)

4 Installation Instruction

⚠WARNING

All phases of this installation must conform to NATIONAL, STATE AND LOCAL CODES. If it is required for additional information, please contact your local distributor.

NOTICE

Graphics here are only for reference. Please refer to actual products. Unspecified dimensions are all in mm.

4.1 Safety Precautions for Installing, Repairing and Moving Units

⚠WARNING	
(1)	The unit should not be installed in places with high environmental pH, high voltage fluctuations, vehicles and ships.
(2)	Do not touch the fins of the heat exchanger. Improper touch can cause damage or injury.
(3)	Do not mix any substances except the refrigerant when installing or moving the refrigerant circuit, and do not leave any air in the pipe. If air or other substances are mixed in the refrigerant circuit, the system pressure will rise and it will cause compressor explosion.
(4)	Do not charge the refrigerant other than the specified one when installing or moving the unit. Otherwise, it may cause problems such as poor operation, malfunction, mechanical fault, etc., and even cause major safety accident.
(5)	When moving or repairing the unit, be sure to use the pressure gauge. First, perform the cooling operation, and then completely close the high pressure side valve (liquid valve). When the pressure gauge reads 0~0.05MPa, completely close the low pressure side valve (air valve), and then immediately stop operation and cut off the power.
(6)	When recovering the refrigerant, it is necessary to ensure that the connection pipe can be disassembled only after the liquid valve and the air valve are completely closed and the power is turned off. If disassembling the connection pipe when the power hasn’t been cut off and the compressor still running, the air will be mixed into the system and then the pressure will rise, which will cause compressor explosion.
(7)	When installing the unit, make sure that the connection pipe is securely connected before turning on the compressor. If the compressor is turned on before the connection of the connection pipe is completed and the shut-off valve is opened, the air will be mixed into the system and then the pressure will rise, which will cause compressor explosion.
(8)	Wiring between indoor unit and outdoor unit must be properly connected by adopting the specified electric wires and the terminals should be fixed well and not affected by external forces. Poor connection or fixing may cause a fire accident.
(9)	No connection is allowed in the middle of the wire. When the length of the connection wire is not enough, please contact the designated service store to re-equip a dedicated electric wire with sufficient length.
(10)	If it vibrates and causes noise, please add rubber cushion between the outdoor unit and the installation base.
(11)	When the outdoor unit is in heating or defrosting, it needs to drain water. When installing the drain pipe, plug the accompanied drainage connector to the drainage hole on the chassis of the outdoor unit. Then connect a drain hose to the drainage connector (If drainage connector is used, the outdoor unit should be at least 10cm from the installation ground.
(12)	For areas with frequent snowfall, please clean up the snow in time to avoid covering unit.
(13)	The unit installed in areas expecting snow are suggested to be raised with support frames.
(14)	If it's possible, please try to avoid the places where the snow will be accumulated easily. If not, please install a protective device to prevent snow accumulated on the top or around of the unit.

4.2 Dimension of Outdoor Unit and Mounting Hole

Unit Outline and Installation Dimension.

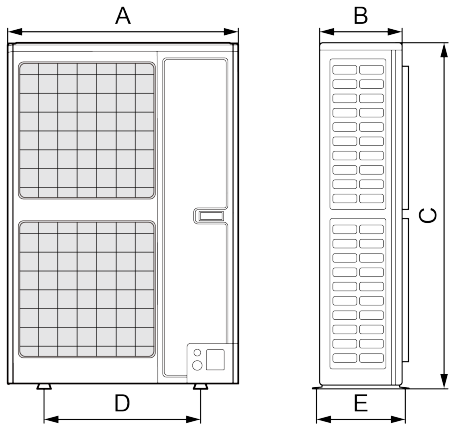


Fig.4.2.1

Unit: mm(inch)

Model	A	B	C	D	E
GMV-V36WL/NhC-T(U) GMV-V48WL/NhC-T(U) GMV-V60WL/NhC-T(U)	900 (35-3/8)	340 (13-3/8)	1345 (53)	572 (22-1/2)	378 (14-7/8)

4.3 Connection Pipe

4.3.1 Schematic Diagram of Piping Connection

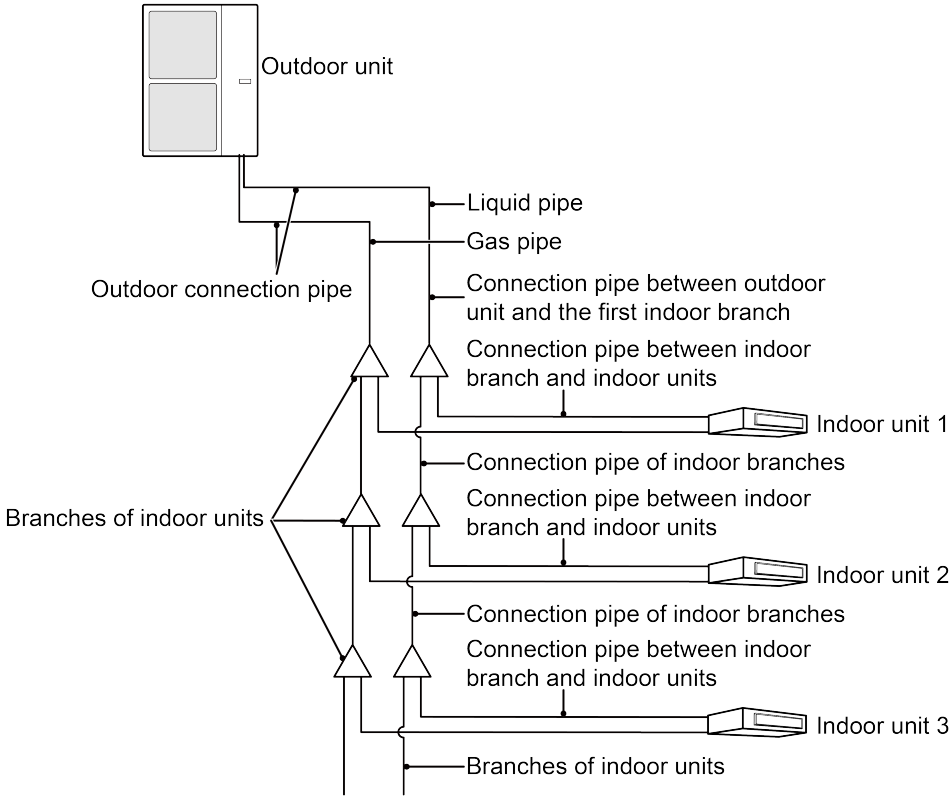


Fig.4.3.1

4.3.2 Allowable Length and Height Difference of Connection Pipe

Y type branch joint is adopted to connect indoor and outdoor units. Connecting method is shown in Fig.4.3.2 below.

NOTICE Equivalent length of one Y-type branch is 0.5m(1-5/8feet).

Unit: m(feet)

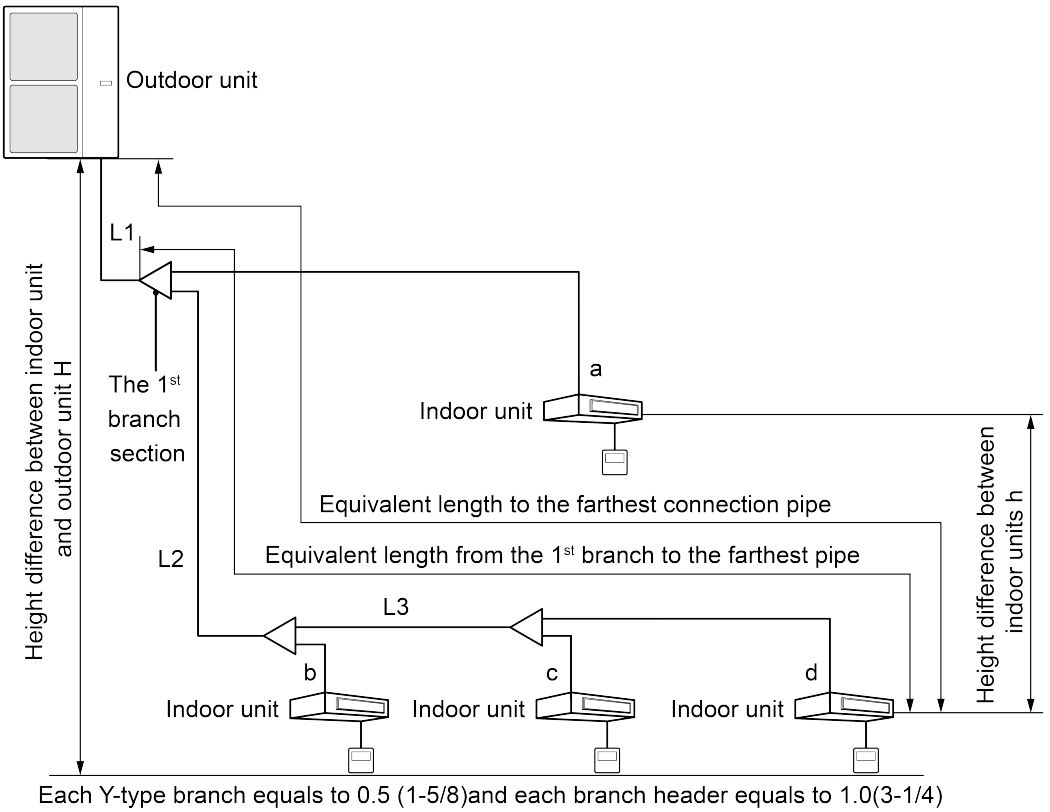


Fig.4.3.2 Allowable Length and Height Difference of Connection Pipe

—		Allowable Value		Fitting Pipe
		m	feet	
Total length (actual length) of fitting pipe		150	492	L1+L2+L3+a+b+c+d
Length of farthest fitting pipe	Actual length	65	213	L1+L2+L3+d
	Equivalent length	80	262	
From the 1st branch to the farthest indoor pipe		40	131	L2+L3+d
Height difference between ODU and IDU	ODU at upper side	50	164	—
	ODU at lower side	40	131	—
Height difference between IDUs		15	49	—

4.3.3 Pipe Selection

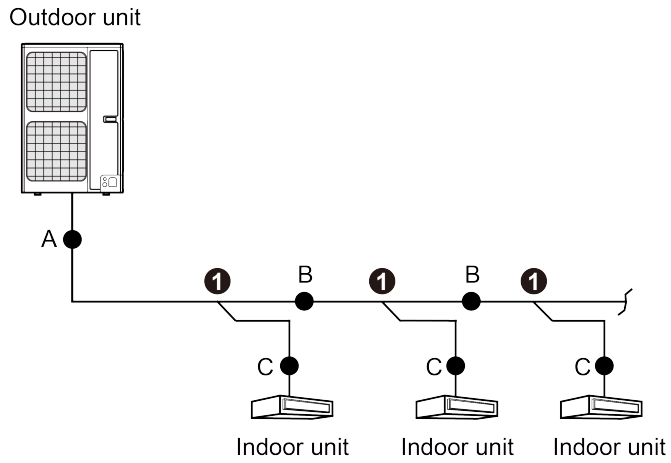


Fig.4.3.3

(1) Pipe "A" between the outdoor unit and the manifold of indoor unit.

The pipe size is based on the dimension of outdoor connection pipe.

Basic Module	Pipe Dimension	
	Gas pipe (mm/inch)	Liquid pipe (mm/inch)
GMV-V36WL/NhC-T(U) GMV-V48WL/NhC-T(U) GMV-V60WL/NhC-T(U)	Φ15.9 (Φ5/8)	Φ9.52 (Φ3/8)

(2) Select the manifold "①" at indoor side.

Manifold at indoor unit side can be selected as per total capacity of downstream indoor unit(s). Refer to the following table.

Refrigerant System	Total Capacity of Downstream Indoor Units X (Btu/h)	Model
Y type branch	X<68200	FQ01A/A
	68200≤X≤102400	FQ01B/A
	102400<X≤238800	FQ02/A
	238800<X≤460600	FQ03/A
	460600<X	FQ04/A

(3) Fitting pipe "B" between indoor side manifolds.

Pipe size (between two manifolds at indoor unit side) is based on the total capacity of downstream indoor unit(s).

Total Capacity of Downstream Indoor Units X (Btu/h)	Gas Pipe (mm/inch)	Liquid Pipe (mm/inch)
X≤19000	Φ12.7 (Φ1/2)	Φ6.35 (Φ1/4)
19000<X≤48500	Φ15.9 (Φ5/8)	Φ9.52 (Φ3/8)
48500<X≤76400	Φ19.05 (Φ3/4)	Φ9.52 (Φ3/8)

(4) Fitting pipe "C" between indoor unit and manifold.

Manifold should be matched with fitting pipe of indoor unit.

Rated Capacity of IDU X(Btu/h)	Gas Pipe (mm/inch)	Liquid Pipe (mm/inch)
X≤9600	Φ9.52 (Φ3/8)	Φ6.35 (Φ1/4)
9600<X≤17000	Φ12.7 (Φ1/2)	Φ6.35 (Φ1/4)
17000<X≤48000	Φ15.9 (Φ5/8)	Φ9.52 (Φ3/8)
48000<X≤55000	Φ19.05 (Φ3/4)	Φ9.52 (Φ3/8)
55000<X≤96000	Φ22.2 (Φ7/8)	Φ9.52 (Φ3/8)

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

4.4 Installation of Connection Pipe

⚠CAUTION	
(1)	Conform to the following principles during pipe connection: Connection pipe should be as short as possible, so is the height difference between indoor and outdoor units. Keep the number of bends as little as possible. Radius of curvature should be as large as possible.
(2)	Weld the connection pipe between indoor and outdoor units. Please strictly follow the requirements for welding process. Rosin joint or pin hole is not allowed.
(3)	When laying the pipe, be careful not to distort it. Radius of bending parts should be over 200mm(8inch). Note that pipes cannot be repeatedly bent or stretched; otherwise the material will get harder. Do not bend or stretch the pipe for more than 3 times at the same position.

4.4.1 Flaring Process

(1) Use pipe cutter to cut the connection pipe in case it is unshaped.

(2) Keep the pipe downward in case cutting scraps get into the pipe. Clear away the burrs after cutting.

(3) Remove the flared nut connecting indoor connection pipe and outdoor unit. Then use flaring tool to fix the flared nut into the pipe (as shown in Fig.4.4.1).

(4) Check if the flared part is flaring evenly and if there is any crack.

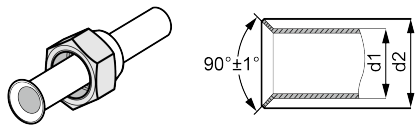


Fig.4.4.1

4.4.2 Pipe Bending

(1) Reshape the pipe by hand. Be careful not to damage the pipe.

(2) Do not bend the pipe over 90°.

(3) If pipe is repeatedly bent or stretched, it will get hard and difficult to bend and stretch again. Therefore, do not bend or stretch the bend for over 3 times.

(4) In case that direct bending will open cracks to the pipe, first use sharp cutter to cut the insulating layer, as shown in Fig.4.4.2. Do not bend the pipe until it is exposed. When bending is done, wrap the pipe with insulating layer and then secure it with adhesive tape.

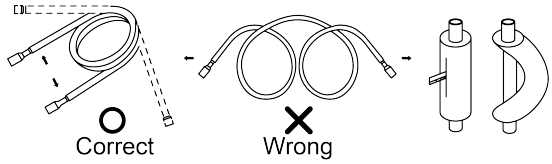


Fig.4.4.2

4.4.3 Indoor Pipe Connection

(1) Remove pipe cover and pipe plug.

(2) Direct the flared part of copper pipe to the center of screwed joint. Twist on the flared nut tightly by hand, as in Fig.4.4.3 (Make sure indoor pipe is correctly connected. Improper location of the center will prevent flared nut from being securely twisted. Thread of nut will get damaged if the flared nut is twisted forcibly).

(3) Use torque wrench to twist on the flared nut tightly until the wrench gives out a click sound (Hold the handle of wrench and make it at right angle to the pipe. as in Fig.4.4.3).

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

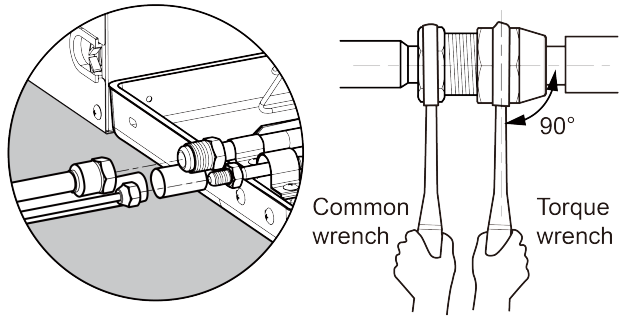


Fig.4.4.3

Pipe Diameter(mm/inch)	Tightening Torque
Φ6.35(1/4)	15~30(N·m)
Φ9.52(3/8)	35~40(N·m)
Φ12.7(1/2)	45~50(N·m)
Φ15.9(5/8)	60~65(N·m)
Φ19.05(3/4)	70~75(N·m)

⚠WARNING

(1) Mechanical connectors used indoors shall comply with ISO 14903. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be refabricated.

(2) Pipework shall be protected from physical damage.

(3) Installation of pipework shall be kept to a minimum space required.

(4) Do NOT re-use joints and copper gaskets which have been used already.

(5) Joints made in installation between parts of refrigerant system shall be accessible for maintenance purposes.

(6) Install the refrigerant piping or components in a position where they are unlikely to be exposed to any substance which may corrode components containing refrigerant, unless the components are constructed of materials that are inherently resistant to corrosion or are suitably protected against corrosion.

(7) After completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements; field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected.

4.4.4 Outdoor Pipe Connection

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

During engineering installation, the connection pipe inside the unit must be wrapped by insulation sleeve.

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

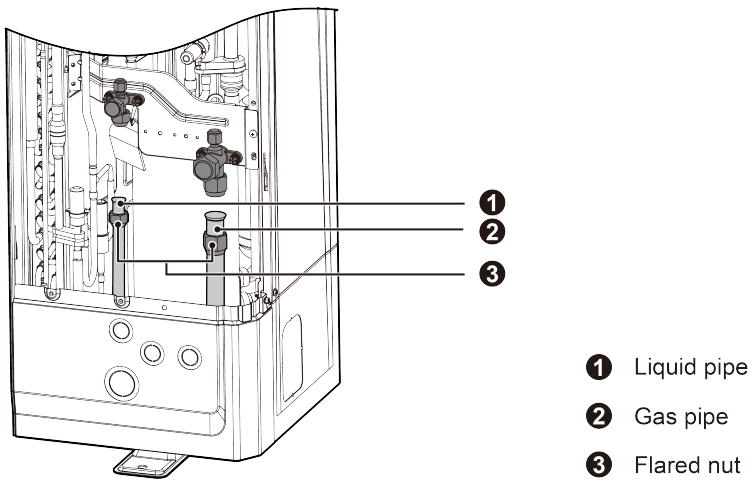


Fig.4.4.4

4.4.5 Installation of Y-type Branch

The main function of manifold is used to shunt the refrigerant. Pay attention to the following points when installing it:

(1) When installing the manifold, it should be as close as possible to the indoor unit to reduce the influence of the indoor unit manifold on the refrigerant distribution.

(2) The manifold must be matched with the equipment. The other products which are not specified by the manufacturer shall not be used.

(3) Check the model before installing the manifold. Do not use it incorrectly.

1) Y-type manifold can be installed vertically or horizontally.

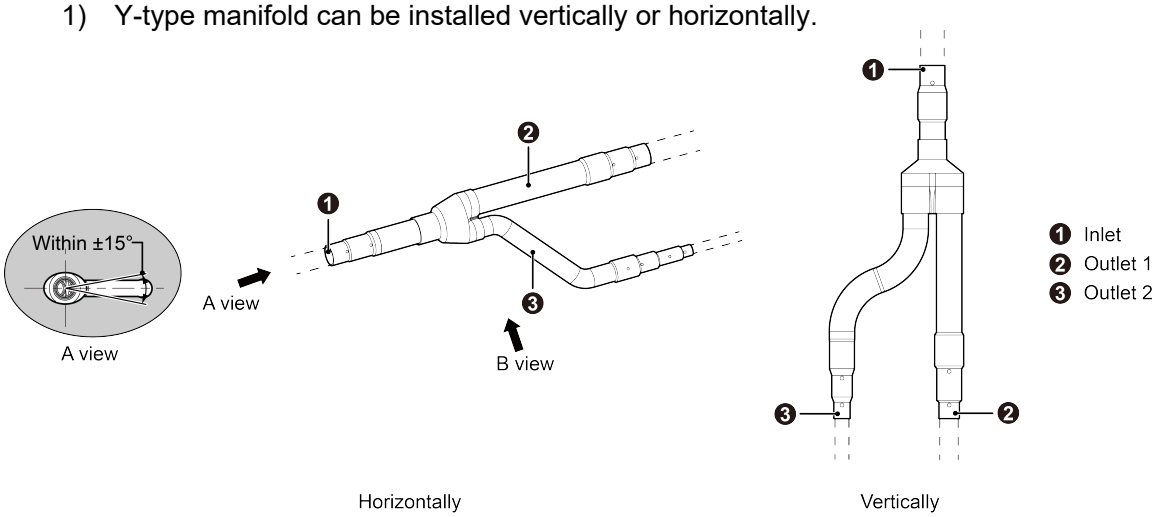


Fig.4.4.5

2) The installation of the branch pipe has the following requirements. Please install it according to the angle shown in the figure below. Improper installation may lead to malfunction of the outdoor unit.

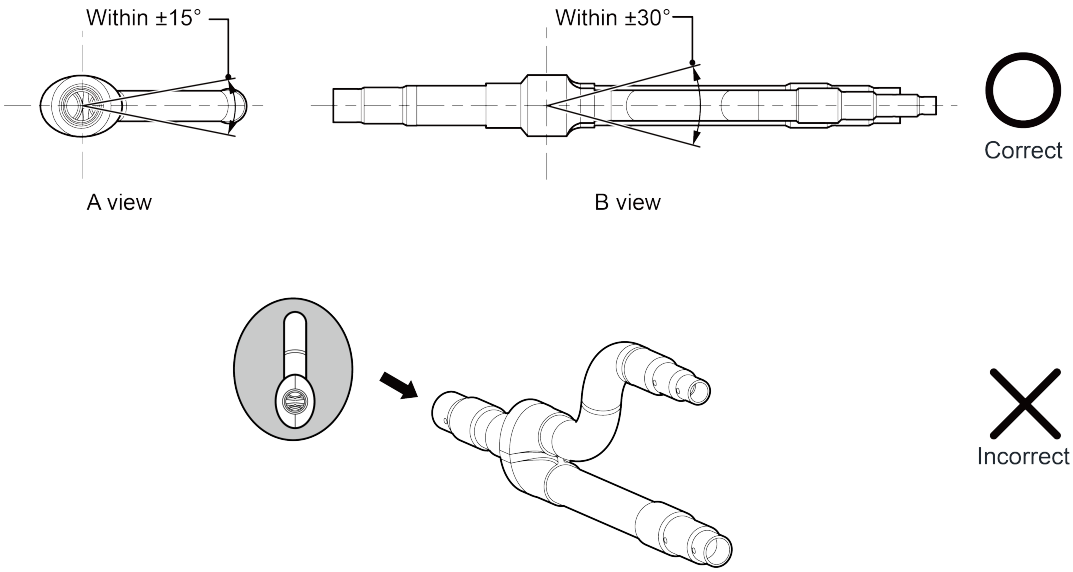


Fig.4.4.6

3) Manifold has several pipe sections with different pipe size, which facilitates to match with various copper pipe. Use pipe cutter to cut in the middle of the pipe section with different pipe size. See the Fig.4.4.7 as below.

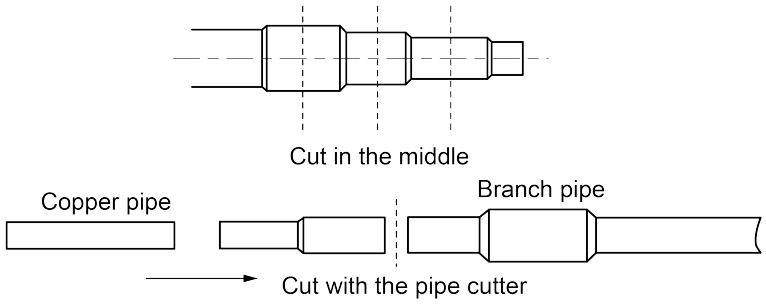


Fig.4.4.7

4) The length of a straight pipe between two manifolds cannot be less than 500mm (19-11/16 inch).
5) The length of a straight pipe before the main pipe port of the manifold cannot be less than 500mm (19-11/16 inch).
6) The length of a straight pipe between the branch of the manifold and the IDU cannot be less than 500mm (19-11/16 inch).

Unit: mm(inch)

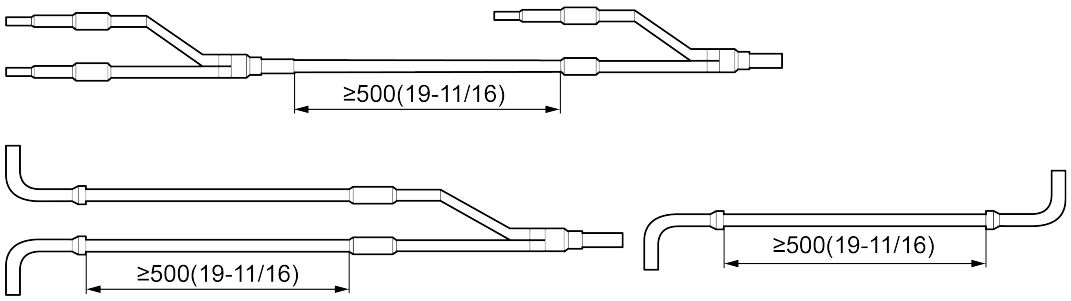


Fig.4.4.8

(4) Fixation of Manifold

1) There must be three fixing point for both horizontal and vertical installation of the Y-type manifold.

Fixing point 1: 100 mm(4 inch) on the main inlet manifold from the welding point.

Fixing point 2: 200 mm(7-7/8 inch) on the main branched pipe from the welding point.

Fixing point 3: 250 mm(9-7/8 inch) on the branched pipe from the welding point.

Unit: mm(inch)

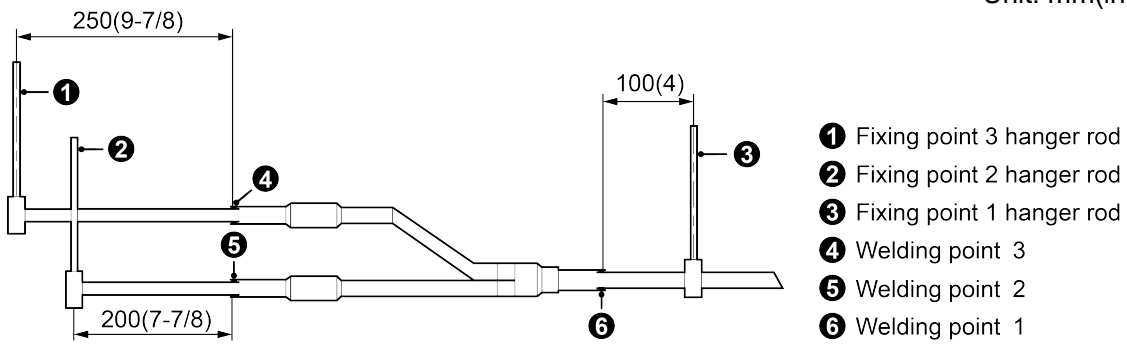


Fig.4.4.9

2) The branches of the manifold should be parallel and should not be overlapped.

3) The liquid pipe and the gas pipe should have the same pipe length and the same laying circuit.

4) Since the structure of the manifold is relatively complicated, it must be rigorous and careful for heat preservation to ensure the tight insulation.

4.4.6 Thermal Insulation for Pipeline

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

(2) At the branch inlet, leave at least 500mm(19-11/16inch) straight pipe section.

(3) Thermal insulation for pipeline

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

2) Joints of indoor and outdoor unit should be wrapped with insulating material and leave no gap between pipe and wall. See Fig.4.4.10.

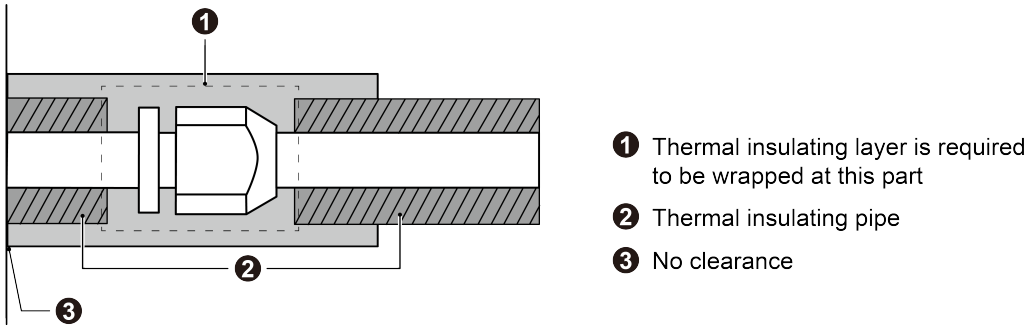


Fig.4.4.10

3) When wrapping the tape, the later circle should cover half of the former one. Don’t wrap the rape too tight, otherwise the insulation effect will be weakened.

4) After wrapping the pipe, apply sealing material to completely seal the hole on the wall.

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

4.4.7 Support and Protection of Pipeline

⚠**CAUTION**	
(1)	Support should be made for hanging connection pipe. Distance between each support cannot be over 1m(3-1/4feet).
(2)	Protection against accidental damage should be made for outdoor pipeline. When pipeline exceeds 1m(3-1/4feet), a pinch board should be added for protection.

4.4.8 Installation of ODU Dry Filters

Due to the complexity of the pipeline of the VRF system, and in order to ensure the dryness and cleanliness of the pipeline and further improve the stability of the system, it is recommended to add a filter to the gas pipe and a dry filter to the liquid pipe during the construction of the project, in addition to operating in strict accordance with the welding requirements.

The operation method is as below:

First of all, weld cut-off valves respectively to the gas and liquid pipe at positions that are close to the outdoor unit and easy to operate. The cut-off valves should have the corresponding pipe diameter.

Second, install a filter (100 meshes per square foot) in the pipeline between the cut-off valve added to the gas pipe and the cut-off valve mounted on the outdoor unit; install a dry filter in the pipeline between the cut-off valve added to the liquid pipe and the cut-off valve mounted on the outdoor unit.

Finally, after debugging is completed:

Turn on all the indoor units in cooling mode for 24 hours, and remove the gas pipe filter: First, power off the whole system; then close the two cut-off valves of the gas pipe and remove the gas pipe filter; finally, directly connect a copper pipe of the same diameter to the corresponding pipeline for vacuum treatment. Then open the two cut-off valves again to resume normal operation.

Turn on all the indoor units in heating mode for 24 hours, and remove the liquid pipe dry filter: First, power off the whole system; then close the two cut-off valves of the liquid pipe and remove the liquid pipe dry filter; finally, directly connect a copper pipe of the same diameter to the corresponding pipeline for vacuum treatment. Then open the two cut-off valves again to resume normal operation.

4.4.9 Disassembly of Compressor Feet

In order to prevent unit from damage during transportation, 2 metal pieces are fitted to outdoor unit's compressor feet before unit leaves factory. See Fig.4.4.11.

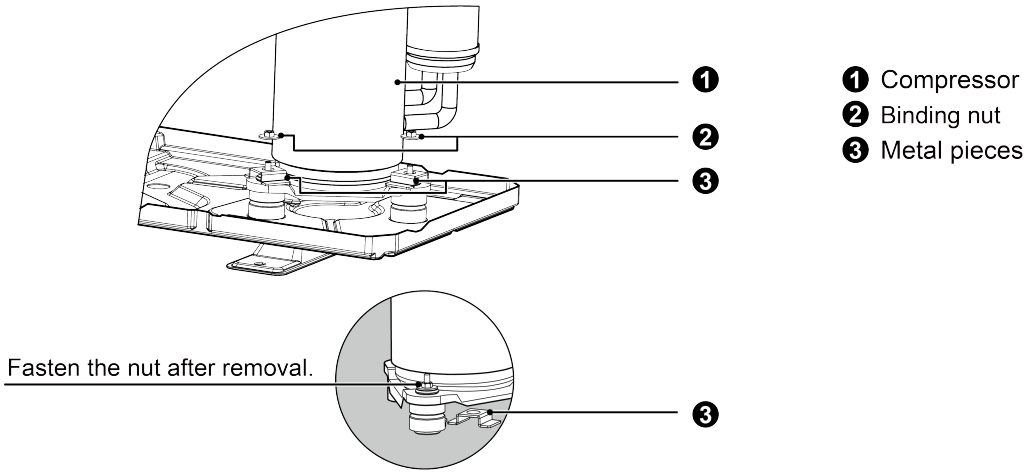


Fig.4.4.11

When installing the unit, metal pieces for transportation must be removed. Then fasten the binding nuts again and wrap back soundproofing cotton. If unit runs with metal pieces fitting on, compressor will shake abnormally and unit's operating life will be shortened.

4.5 Vacuum Pumping, Refrigerant Adding

⚠CAUTION

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

4.5.1 Vacuum Pumping

(1) Outdoor unit has been charged with refrigerant before delivery. Field-installed connection pipe needs to be charged with additional refrigerant.

(2) Confirm whether outdoor liquid and gas valves are closed.

(3) Use vacuum pump to withdraw the air inside indoor unit and connection pipe from the outdoor valve, as shown in Fig.4.5.1 below.

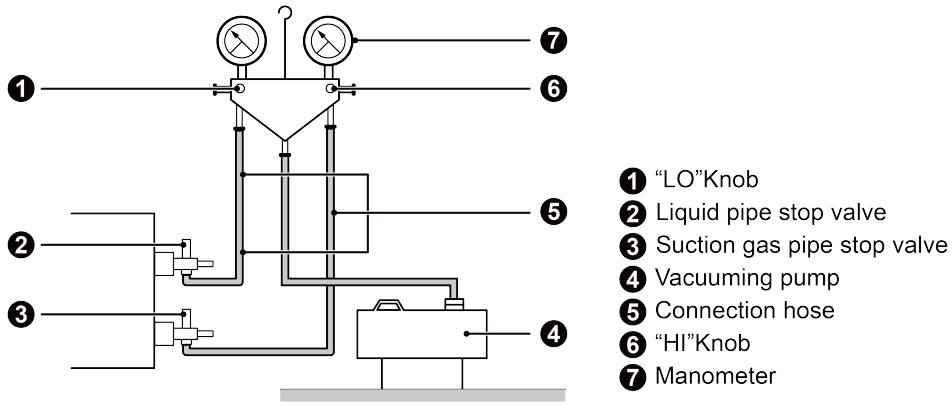


Fig.4.5.1

4.5.2 Additional Refrigerant Charging

NOTICE	
(1)	The amount of refrigerant charged into the system before leaving the factory does not include the amount of refrigerant added to the pipelines and the outdoor unit.
(2)	The additional amount of refrigerant added to the pipelines is determined according to the size of the liquid pipe and its length on site.
(3)	Record the amount of refrigerant added to facilitate after-sales maintenance.

(1) Additional refrigerant charge R = pipeline additional refrigerant charge A + outdoor unit additional refrigerant charge B

(2) Calculation of pipeline additional refrigerant charge A

Pipeline additional refrigerant charge A = liquid pipe length (Σ) × additional refrigerant charge per meter of the liquid pipe.

X1: The length of liquid pipe Φ6.35mm(Φ1/4 inch);

X2: The length of liquid pipe Φ9.52mm(Φ3/8 inch);

The Length of X1+X2	The Length of X2	Quantity Additional Refrigerant Charge Per Meter of the Liquid Pipe A
≤20m(65-5/8feet)	≤20m(65-5/8feet)	0
>20m(65-5/8feet)	≥20m(65-5/8feet)	(X2-20m)×0.051kg/m + X1×0.018kg/m {X2-(65-5/8ft)} ×0.034LBS/ft + X1×0.012LBS/ft
	<20m(65-5/8feet)	(X1+X2-20m)×0.018 kg/m {X1+X2-(65-5/8ft)} ×0.012LBS/ft

(3) Calculation of outdoor unit additional refrigerant charge B(kg(LBS))

Indoor Unit Quantity	Outdoor Unit Capacity(kBtu/h)		
	36	48	60
≤4	0	0	0
≥5	0.9(1.98)	0.9(1.98)	1.4(3.09)

NOTE:

The maximum refrigerant charging volume for the system can't exceed 16.5LBS (including the refrigerant charged in the factory).

Record the amount of refrigerant added to facilitate after-sales maintenance. After ensuring that the system does not leak and the compressor is not working, first charge the specified amount of R32 into the unit from the injection port of the outdoor unit liquid pipe valve until the required amount is reached. If the amount of refrigerant that needs to be added cannot be filled quickly due to pressure rise in the pipe, then power on the unit in cooling mode and charge the refrigerant through the gas valve of the outdoor unit.

For example:

The ODU is composed of the module: 60 kBtu/h.

The IDUs are made up of 4 sets of 15 kBtu/h.

X1=30m(98feet), X2=15m(49feet)

The pipeline additional refrigerant charge A =(30+15-20)×0.018=0.45kg

(98+49-65-5/8)×0.012=0.97LBS

outdoor unit additional refrigerant charge B=0kg(0LBS)

Total Additional refrigerant charge R =0.45+0=0.45kg (0.97+0=0.97LBS).

4.5.3 Engineering Installation Information Confirmation

Calculate the additional refrigerant quantity according to the method in section 4.5.2, and record the additional refrigerant quantity and related engineering pipe length information in the engineering installation information confirmation table.

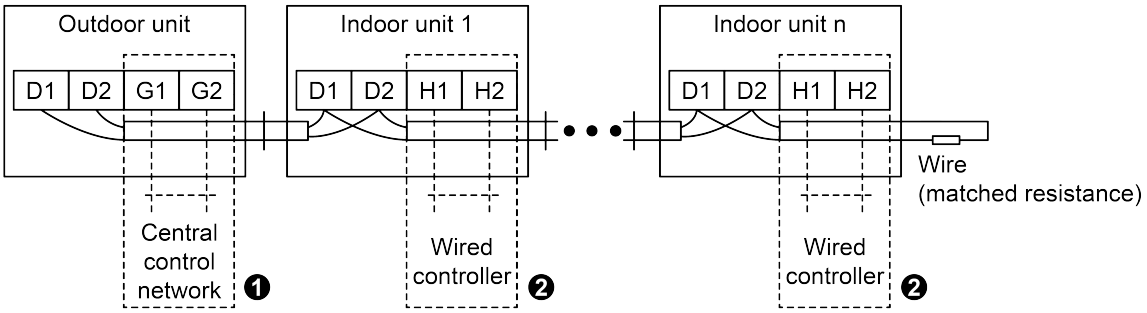
INFORMATION CONFIRMATION TABLE FOR ENGINEERING INSTALLATION			
Length and height of connection pipe	The length from the outdoor unit to the first branch		ft.
	The length from the first branch to the farthest indoor unit		ft.
	Location of outdoor unit	☐upper side/☐middle/☐lower side	
	The maximum height from the indoor unit to the outdoor unit (outdoor unit is above indoor unit/outdoor unit is under the indoor unit)	/	ft.
Refrigerant additional information	The length of pipe Φ1/4 inch/The length of pipe Φ3/8 inch		ft.
	Additional refrigerant volume A for the pipe/Additional refrigerant charge volume B for the outdoor unit	/	LBS.
	Total additional refrigerant volume A+B	/	LBS.
Installation completion date/Commissioning completion date		/	
1. Length and height of connection pipes can't exceed the range indicated in the instruction manual. 2. The maximum refrigerant charging volume for the system can't exceed 7.5kg(16.5LBS) (including the refrigerant charged in the factory). 3. When this table is filled, please stick it at the inner surface of side plate of the unit for checking during maintenance.			

4.6 Electric Wiring

⚠WARNING	
(1)	All electrical installation must be performed by qualified technicians in accordance with local laws, regulations and this user manual.
(2)	Use air conditioner specialized power supply and make sure that it is consistent with system's rated voltage.
(3)	Do not pull the power cord with force.
(4)	Caliber of the power cord must be large enough. A damaged power cord or connection wire must be replaced by specialized electrical cords.
(5)	Connect the unit to specialized grounding device and make sure it is securely grounded. It's a must to install air switch and current circuit breaker that can cut off the power of the entire system. The air switch should include magnetic trip function and thermal trip function so that system can be protected from short circuit and overload.
(6)	Air conditioner belongs to class I electrical appliance, so it must be securely grounded.
(7)	The yellow-green wire inside the unit is a ground wire. Do not cut it off or secure it with tapping screws, otherwise it will lead to electric shock.
(8)	Power supply must include secure grounding terminal. Do not connect the ground wire to the following: ①Water pipe; ②Gas pipe; ③Drain pipe; ④Other places that are deemed as not secure by professional technicians.
(9)	Be sure the power supply has been cut off and the capacitor on the main board has been discharged prior to electric wiring and service.
(10)	Do not change any part; and do not shield, shortcut or remove any part.

4.6.1 Wiring Diagram

Connection of power cord and communication cord. Supply power for each unit separately. Each unit shall be equipped with a circuit breaker for short circuit and abnormal overload protection.

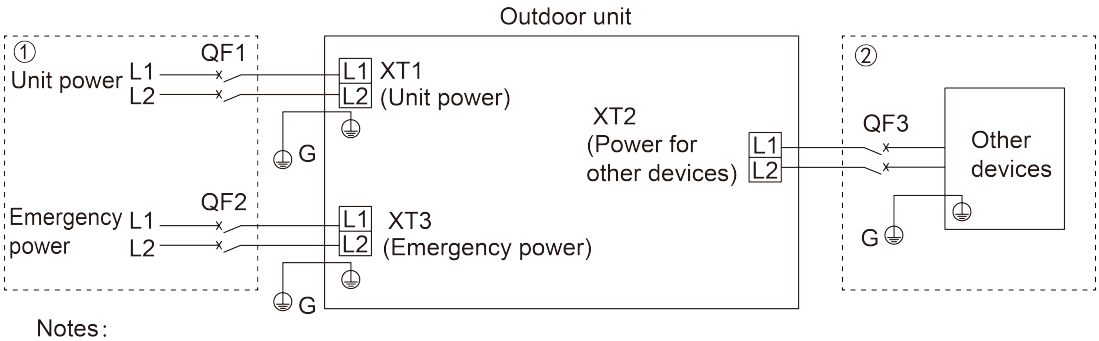


Note: (1) Whether the unit is with centralized network control function or wired controller function, please refer to the circuit diagram. For outdoor units equipped with the function of central control, connect wires according to drawing ❶. For indoor units with the function of wired control, connect wires according to drawing ❷.

(2) n represents the maximum number of connectable indoor units, which is determined by the capacity of the outdoor unit. For details, please refer to the capacity configuration instructions of the unit.

Fig.4.6.1

NOTE: Keep all the units in the same system energized during using. Otherwise, the system will not operate normally.



Notes:

① Unit power and emergency power are independent, and they can't be shared together.

② All connected devices must meet UL certification requirements. The installation of devices needs to comply with local regulations.The MCA of the equipment shall not exceed 15A, and the equipment should be reliably grounded.

Fig.4.6.2

NOTE: Connect the power cord to the corresponding terminal and grounding screws. Please refer to the circuit diagram for wiring.

⚠ WARNING	
(1)	Before starting work, check that power is not being supplied to the indoor unit and outdoor unit.
(2)	Wrong wire connection may burn the electrical components.
(3)	Connect the connection cords firmly to the terminal block. Imperfect installation may cause a fire.
(4)	Always connect the ground wire.

4.6.2 Electrical Parameters

(1) For Unit Power, selection of air switch are as below：

1) Outdoor Only：

Model	Power Supply	Fuse Capacity (A)	Maximum Over-Current Protection (A)	Minimum Circuit Ampacity (A)
GMV-V36WL/NhC-T(U)	208/230V-1Ph-60Hz	40	40	36.9
GMV-V48WL/NhC-T(U)	208/230V-1Ph-60Hz	40	40	38.1
GMV-V60WL/NhC-T(U)	208/230V-1Ph-60Hz	40	40	39.3

2) Outdoor + Other devices:

Model	Power Supply	Fuse Capacity (A)	Maximum Over-Current Protection (A)	Minimum Circuit Ampacity (A)
GMV-V36WL/NhC-T(U)	208/230V-1Ph-60Hz	60	60	51.9
GMV-V48WL/NhC-T(U)	208/230V-1Ph-60Hz	60	60	53.1
GMV-V60WL/NhC-T(U)	208/230V-1Ph-60Hz	60	60	54.3

(2) For Emergency Power, selection of air switch are as below：

Model	Power Supply	Fuse Capacity (A)	Maximum Over-Current Protection (A)	Minimum Circuit Ampacity (A)
GMV-V36WL/NhC-T(U)	208/230V-1Ph-60Hz	15	15	1
GMV-V48WL/NhC-T(U)	208/230V-1Ph-60Hz	15	15	1
GMV-V60WL/NhC-T(U)	208/230V-1Ph-60Hz	15	15	1

NOTICE	
(1)	Unit power and Emergency power are independent, and they can't be shared together.
(2)	An all-pole disconnection switch having a contact separation of at least 3mm (1/8 inch) in all poles should be connected in fixed wiring.
(3)	The circuit breaker specification in above sheet is based on max power (max current) of the unit.
(4)	The power cord specification in above sheet is based on ambient temperature of 40°C(104°F).
(5)	The circuit breaker specification in above sheet is based on ambient temperature of 40°C(104°F). If the working condition is different, please adjust it according to the specification sheet of circuit breaker.

4.6.3 Engineering Wiring of Power Supply and Communication Cable

(1) Please refer to the following part for wiring. Connect the power cord and communication cord to the corresponding wiring board and grounding screws according to the circuit diagram.

(2) The wiring shall not touch the pipeline, edge and device.

(3) For the wiring of power and communication cord, the picture is for reference only. If there’re discrepancies between it and the structure in the picture, the actual unit shall prevail.

(4) Let the communication cables laid out through cabling through, conduit tube or cable channel.

(5) Wiring is subject to the self-equipped diagram of the unit used at present.

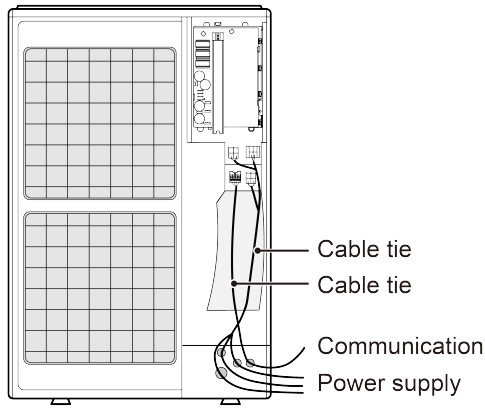


Fig.4.6.3

5 Check Items after Installation and Test Operation

5.1 Check Items after Installation

Check Items	Possible Conditions Due to Improper Installation	Check
Each part of the unit is installed securely?	Unit may drop, shake or emit noise.	
Gas leakage test is taken or not?	Insufficient cooling (heating) capacity.	
Unit gets proper thermal insulation or not?	There may be condensation and dripping.	
Drainage is smooth or not?	There may be condensation and dripping.	
Is the voltage in accordance with the rated voltage specified on the nameplate?	Unit may 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 or not?	Electrical leakage.	
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.	
Binding pieces on compressor feet are removed or not?	Compressor may get damaged.	

5.2 Test Operation and Debugging

NOTICE
(1) After finishing the first installation or replacing the main board of outdoor unit, it is necessary to perform test operation and debugging. Otherwise, unit won't be able to work.
(2) Test operation and debugging must be performed by professional technicians or under the guidance of professional technicians.

5.2.1 Prepare the Test Operation and Debugging

(1) Do not connect power until all installation work is finished.

(2) All control circuits and wires are correctly and securely connected.

(3) Check whether unit's appearance and pipeline system has been damaged during transportation.

(4) Calculate the quantity of refrigerant that needs to be added according to the pipe length. Pre-charge the refrigerant. In case that the required charging quantity is not reached while refrigerant can't be added, record the quantity of refrigerant that still needs to add and complement the quantity during test operation. For details of adding refrigerant during test operation, see below.

(5) After refrigerant is added, make sure valves of outdoor unit are completely open.

(6) For the convenience of troubleshooting during debugging, unit shall be connected to a PC with applicable debugging software. Make sure unit's real-time data can be checked through this computer. The installation and connection of debugging software can be found in the Service Manual.

(7) Before test operation, make sure unit is power on and compressor has been preheated for more than 8 hours. Touch the unit to check whether it's normally preheated. If yes, start test operation. Otherwise, compressor might be damaged.

5.2.2 Test Operation and Debugging

Description of test operation procedures and main board display of ODU.

Instructions for Different Commissioning Stages			
—	Debugging code		Code Meaning and Operation Methods
Progress	LED		
	Display Code	Display status	
01_Setting of master control unit	A0	ON	The unit is in debugging standby status. Press and hold the button SW3 for over 5s, and it will automatically start debugging.
	01	ON	The master outdoor unit is automatically set by the system. 2s later, the next step "Address allocation" starts.
02_Address allocation	02/Ad	Display circularly	The system is allocating addresses. 10s later, it will display as below.
	02/oC	Display circularly	Address allocation is done. 2s later, the next step starts.
03_ODU quantity confirmation	03/01	Display circularly	The system is confirming. 2s later, the next step starts.
04_IDU quantity confirmation	04/00~n	Display circularly	"00~n" displays the quantity of indoor units (including thermal storage modules) identified by the system. The displayed quantity may be different from the actual quantity. Please check personally. If the actual quantity is different from the displayed one, power off the indoor and outdoor units, and check if the connection of IDU communication lines is faulted. After checking, connect power and start debugging from step 01. If the displayed quantity is correct, press the button SW3 on the main board in 30s to confirm it; if it is not confirmed within 30s, the system will automatically enter the next step. After confirmation, it will display as below.
	04/oC	Display circularly	The quantity of indoor units has been confirmed. 2s later, the next step starts.
05_ Detection of ODU internal communication and capacity ratio	05/C2 05/C3	Display circularly	The main control of the outdoor unit cannot communicate normally with the drive. Please check whether the communication line connection between the outdoor unit main board and the drive board is normal, and proceed to the next step after troubleshooting. If the outdoor unit needs to be powered off during the troubleshooting process, restart debugging from step 01 after the unit is powered on.
	05/oC	Display circularly	The main control of the outdoor unit can communicate normally with the drive. Then the system will detect the capacity ratio of indoor and outdoor units. If the ratio is within range, the system will automatically enter the next step after 2s; if the capacity ratio is out of range, it will display as below.
	05/CH	Display circularly	The rated capacity ratio of indoor units is too high. Change the combination of indoor and outdoor units to make the capacity ratio within a reasonable range, and restart debugging from step 01.
	05/CL	Display circularly	The rated capacity ratio of indoor units is too low. Change the combination of indoor and outdoor units to make the capacity ratio within a reasonable range, and restart debugging from step 01.

Instructions for Different Commissioning Stages			
—	Debugging code		Code Meaning and Operation Methods
Progress	LED		
	Display Code	Display status	
06_ Detection of ODU components	06/Corresponding error code	Display circularly	Outdoor unit components are faulted. The corresponding error code flashes, except "06". After errors are eliminated, it will automatically enter the next step. If the outdoor unit needs to be powered off during the troubleshooting process, restart debugging from step 01 after the unit is powered on.
	06/oC	Display circularly	The system detects no error on outdoor unit components. 10s later, the next step starts.
07_ Detection of IDU components	07/XX/error code	Display circularly	The system detects errors on indoor unit components. XX represents the project code of the faulty indoor unit. For example, when indoor unit No.01 has errors d5 and d6 and indoor unit No.03 has errors d6 and d7, the nixie tube circularly displays "07", "01", "d5", "d6", "03", "d6", "d7". After errors are eliminated, it will automatically enter the next step. If the outdoor unit needs to be powered off during the troubleshooting process, restart debugging from step 01 after the unit is powered on.
	07/XXXX/error code	Display circularly	If errors occur to an indoor unit whose project code has 3 or more digits, the upper two digits of the project code will be displayed first, then the lower two digits and finally the error code. For example: If indoor unit No.101 has the error L1, the nixie tube will circularly display "01", "01", and "L1". If multiple errors occur to multiple indoor units, the display method is the same.
	07/oC	Display circularly	There is no error on indoor unit components. 5s later, the next step starts.
08_Compressor preheating confirmation	08/UO	Display circularly	The compressor is not sufficiently preheated. The nixie tube will keep displaying as shown on the left until the preheating time of the compressor reaches 8 hours. Pressing SW3 can skip the waiting time, and the system will enter the next step 2s later (Note: If the compressor is started when the preheating time is less than 8 hours, there is a risk of damage to the compressor, please be careful).
	08/oC	Display circularly	If the outdoor unit has been continuously connected to power for a period of≥8h, or the last time when the unit was continuously connected to power for a period of≥8h is within 2 hours from the current time (a clock chip is required), it means compressor preheating is completed. 2s later, the next step starts
09_ Refrigerant judgment before startup	09/U4	Display circularly	Refrigerant in the system is insufficient. In this case, startup is prohibited and buttons are all invalid. Please power off the indoor and outdoor units, and check whether there is leakage in the pipeline. After fixing the leakage problem, recharge the refrigerant as per the required amount. After recharging, re-energize the unit and start debugging again from step 01 (Note: The unit must be powered off before refrigerant charging. This is to prevent the unit from automatically entering the next step to start running during refrigerant charging).
	09/oC	Display circularly	The amount of refrigerant in the system is normal. 2s later, the next step starts.

Instructions for Different Commissioning Stages			
—	Debugging code		Code Meaning and Operation Methods
Progress	LED		
	Display Code	Display status	
10_ Judgment of ODU valves before startup	10/on	Display circularly	Judgment on the valves of the outdoor unit is in progress. The compressor starts operation for about 2 minutes and then stops. The opening status of the big and small valves of the outdoor unit is judged as below.
	10/U6	Display circularly	The valves of the outdoor unit are not fully opened. Press the button SW4 on the main board to display "09/oC", and then check whether the big and small valves of the outdoor unit are fully opened. After confirming, press the button SW4 on the main board again. Then the compressor will start operation for about 2 minutes to re-judge the valve status.
	10/oC	Display circularly	Valve status is normal and the display is as shown on the left. 2s later, the next step starts.
12_Confirmation of debugging startup	12/AP	Display circularly	Wait for confirmation to start debugging. Press the button SW3 on the main board within 1 minute to confirm the start of debugging. If the user does not operate within 1 minute, it will be automatically confirmed. After confirmation, the main board indicator will display as below.
	12/AE	Display circularly	Unit start-up is confirmed. After displaying for 2 seconds, the system starts debugging. If the project requires additional refrigerant charge but refrigerant is not complemented before debugging, then it can be added through the low-pressure service port during this process.
15_Debugging	15/AC or 15/AH	Display circularly	During the debugging process, if the system has been running for 50 minutes without an error, it is determined that the system is normal. After the whole system is shut down for 5s, it will enter standby mode.
	15/Corresponding error code	Display circularly	An error occurs during debugging.
Debugging completed	OF	On	The whole unit has finished debugging and the system is in standby mode.

5.2.3 Appendix: Reference of Normal Operation Parameters

No.	Debug item		Parameter name	Unit	Reference
1	System parameters	ODU parameters	Outdoor temperature	°C(°F)	—
2			Compressor discharge temperature	°C(°F)	● When compressor starts, discharge temp in cool mode is within 70~105°C(158~221°F) and at least 10°C(18°F) higher than the high pressure saturation temperature. ● As for temp in heat mode, it is within 65~90°C(149~194°F) and at least 10°C (18°F) higher than the high pressure saturation temperature.
3			Defrosting temperature	°C(°F)	● In cool mode, defrosting temperature is 4~10°C(7.2~18°F) lower than system's high pressure value. ● In heat mode, defrosting temperature is about 2°C(3.6°F) different from system's low pressure value.

No.	Debug item		Parameter name	Unit	Reference
4	System parameters	ODU parameters	System high pressure	°C(°F)	● In cool mode, the normal high pressure value is within 20~55°C(68~131°F). According to the change of ambient temperature and system's operating capacity, the high pressure value will be 10~30°C(18~54°F) higher than ambient temperature. The higher ambient temperature is, the smaller temperature difference is. If ambient temp is 25~35°C(77~95°F) in cool mode, system's high pressure value will be within 44~53°C(111~127°F). ● In heat mode, if ambient temperature is above -5°C(23°F), system's high pressure value is within 40~52°C(104~126°F). If ambient temperature is low and many IDUs are turned on, the high pressure will be lower.
5			System low pressure	°C(°F)	● When ambient temperature in cool mode is 25~35°C(77~95°F), the low pressure value is 0~8°C(32~46°F). ● When ambient temperature in heat mode is above -5°C(23°F), the low pressure value is -15~8°C(5~46°F).
6			Opening degree of thermal EXV	PLS	● In cool mode, the thermal electronic expansion valve remains 480PLS. ● In heat mode, the adjustable opening degree of EXV is 60~480PLS.
7			Compressor's operating frequency	Hz	Changes in 15Hz~120Hz.
8			Compressor's operating current	A	When compressor works normally, the current is no more than 18A.
9			Compressor's IPM temperature	°C(°F)	When ambient temperature is below 35°C(95°F), IPM temp is lower than 80°C(176°F) and the highest temperature won't be above 95°C(203°F).
10			Fan motor's operating frequency	Hz	Changes in 0~50Hz according to system's pressure.
11		IDU parameters	IDU ambient temperature	°C(°F)	—
12			Indoor heat exchanger's inlet temperature	°C(°F)	● According to ambient temperature, for a same IDU in cool mode, the inlet temp will be 1~7°C(1.8~12.6°F) lower than the outlet temperature, and 4~9°C(7.2~16.2°F) higher than the low pressure value. ● For a same IDU in heat mode, the inlet temperature will be 10~20°C(18~36°F) lower than the outlet temperature.
13			Opening degree of indoor EXV	PLS	● In cool mode, the opening degree of indoor EXV varies within 50~480PLS. ● In heat mode, the opening degree of indoor EXV varies within 35~480PLS.
14	Communication parameters		Communication data	—	Number of IDUs detected by software is the same with the actual number. No communication error.
15	Drainage system		—	—	Indoor unit can drain water out completely and smoothly. Condensate pipe has no backward slope of water; Water of outdoor unit can be drained completely through drainage pipe. No water drop from unit base.
16	Others		—	—	Compressor and indoor/outdoor fan motor do not have strange noise. Unit can operate normally.

6 Common Malfunctions and Troubleshooting

⚠WARNING
(1) If an abnormal situation (such as peculiar smell) occurs, please stop the operation immediately and turn off the main power supply, and then contact Gree authorized maintenance center. If the unit continues to operate under abnormal situation, the air conditioner will be damaged and an electric shock or fire accident may result.
(2) Do not maintain the air conditioner by yourself, misoperation may cause electric shock or fire hazard. Please contact professional personnel of Gree authorized maintenance center to maintain.

- Before asking for maintenance, please check the following issues first.

Phenomenon	Causes	Troubleshooting
Air conditioner can't operate	Fuse is broken or circuit breaker is open	Replace fuse or close the circuit breaker
	Power failure	Restart up the unit and then the unit will operate
	Power supply is not connected	Connect the power supply
	The power for batteries of remote controller is insufficient	Replace the batteries
	Remote controller is not within the remote control range	Remote control range is within 8m
Air conditioner operates, while it stops operation immediately	Air inlet or air outlet of indoor unit/outdoor unit is blocked	Eliminate the obstacles
Cooling or heating is abnormal	Air inlet or air outlet of indoor unit/outdoor unit is blocked	Eliminate the obstacles
	Temperature setting is improper	Adjust temperature setting by remote controller or wired controller
	Fan speed is set too low	Adjust fan speed setting by remote controller or wired controller
	Fan direction is not correct	Adjust fan direction setting by remote controller or wired controller
	Door or window is open	Close door and window
	Direct sunshine	Hang curtains or window shade at the window
	Too many persons in the room	—
	Too many thermal source in the room	Reduce the thermal source
	The filter is dirty and blocked	Clean the filter

- Instruction

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

- Following circumstances are not malfunctions.

Phenomenon		Causes
Unit doesn't run	When unit is started immediately after it is just turned off	Overload protection switch makes it run after 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	When the power supply is connected, there is small "dada" sound.	It is the sound of startup action of electronic expansion valve.
	When the system is conducting cooling or defrosting, there is continuous "sa——" sound.	This is the sound of refrigerant flowing inside the unit.
	When the system is switching cooling and heating modes; during heating operation, the unit enters or quits defrosting operation or oil return operation, there is "chi——" sound.	This is the sound for direction reversal of 4-way valve.
	When the system is started or stopped for a short time, you can hear the sound of "sa——"; you can also hear this sound for a short time after the start or stop of the defrosting operation.	This is the sound produced when the refrigerant stops or changes the flow.

Phenomenon		Causes
Noise is emitted	When the system is in cooling operation or after it stops running, a continuous “sa ——” sound can be heard	This is the operation sound of drain system.
	When the system is running or after it stops running, a “creaking” sound can be heard.	This is the sound produced when plastic parts such as panel expansion and contraction due to temperature changes.
	When the system is in heating operation, after the indoor unit stops running, the sound like running water can be heard.	The unit is melting the frost on the outdoor unit, please wait about 10 minutes (due to different unit models, the waiting time will vary).
	When the indoor unit stops running, a faint “sa——” sound or “gurgling” sound can be heard.	This sound can be heard when other indoor units are running. This is to prevent oil and refrigerant from staying in the indoor unit, and to keep a small amount of refrigerant flowing.
	When the unit is running, the operating sound of the compressor changes.	This is caused by changes in compressor operating frequency.
	During the operation of the unit or after the operation is started or stopped, a continuous “sa ——” sound can be heard.	This is the sound produced when the refrigerant bypass valve operates.
	When the operating mode of the unit changes, the indoor unit and outdoor unit will produce “sa ——” and “gurgling” sounds.	This is the sound produced when the refrigerant stops or changes flow.
	The sound from the outdoor unit can be heard indoors	This is because the outdoor unit is installed close to the window or wall, and the sound insulation is poor, and the external noise is transmitted in.
There is dust blowing out from the unit	Start operation after it is not used for a long time	Dust in indoor unit is blew out
The unit emits odor	Operating	The odor of the air conditioner is sucked into the room and then blown out
The indoor unit is still running after shutting down	The indoor unit is still running after shutting down	The fan of indoor unit will continue to work for 20 to 70 seconds to fully use the residual cooling or heat of the heat exchanger, and to prepare for the next use.
Mode conflict	Cooling or heating mode cannot start up	When the selected operation mode of the indoor unit conflicts with the operation mode of the outdoor unit, after five seconds, the indoor unit error indicator flashes or the remote controller displays the operation conflict, and the indoor unit shuts down. At this time, the indoor unit can be converted to run with the outdoor unit. The mode can be restored to normal without conflict. The cooling mode and dry mode do not conflict, and the air supply does not conflict with any mode.
Wired controller displays A3 code	Unit enters frost mode operation	During cold weather heating operation, when frost or ice may form on the outdoor unit heat exchanger, the unit will automatically enter the defrost mode for a few minutes.
Wired controller displays A4 code	Unit enters oil-return mode operation	When the outdoor unit runs for a certain time, it will automatically enter the oil return mode to run for a few minutes to ensure that the internal compression of the external machine is effectively lubricated.

7 Error Indication

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

Indoor:

Error Code	Content	Error Code	Content
L0	Malfunction of IDU (uniform)	d1	Indoor PCB is poor
L1	Protection of indoor fan	d2	Malfunction of lower water temperature sensor of water tank
L2	Auxiliary heating protection	d3	Malfunction of ambient temperature sensor
L3	Water-full protection	d4	Malfunction of entry-tube temperature sensor
L4	Abnormal power supply for wired controller	d5	Malfunction of middle temperature sensor
L5	Freeze prevention protection	d6	Malfunction of exit-tube temperature sensor
L6	Mode shock	d7	Malfunction of humidity sensor
L7	No main IDU	d8	Malfunction of water temperature sensor
L8	Power supply is insufficient	d9	Malfunction of jumper cap
L9	For single control over multiple units, number of IDU is inconsistent	dA	Web address of IDU is abnormal
LA	For single control over multiple units, IDU series is inconsistent	dH	PCB of wired controller is abnormal
LH	Alarm due to bad air quality	dC	Abnormal setting for capacity button
LC	IDU is not matching with outdoor unit	dL	Malfunction of air outlet temperature sensor
LL	Malfunction of water flow switch	dE	Malfunction of indoor CO_2 sensor
LE	Rotation speed of EC DC water pump is abnormal	dF	Malfunction of upper water temperature sensor of water tank
LF	Malfunction of shunt valve setting	dJ	Malfunction of backwater temperature sensor
LJ	Setting of functional DIP switch code is wrong	dP	Malfunction of inlet tube temperature sensor of generator
LP	Zero-crossing malfunction of PG motor	dU	Malfunction of drainage pipe temperature sensor of generator
LU	Indoor unit's branch is not inconsistent for one-to-more unit of heat recovery system	db	Debugging status
Lb	Inconsistent IDU of group-controlled reheat and dehumidification system	dd	Malfunction of solar power temperature sensor
y1	Malfunction of inlet tube temperature sensor 2	dn	Malfunction of swing parts
y2	Malfunction of outlet tube temperature sensor 2	dy	Malfunction of water temperature sensor
y7	Malfunction of fresh air intake temperature sensor	y8	Main error of indoor air box sensor
yA	IFD malfunction	yb	Refrigerant Leakage Protection
yd	Malfunction of Refrigerant Detection Sensor	En	Malfunction of System Refrigerant Detection

Outdoor:

Error Code	Content	Error Code	Content
F0	Main board of ODU is poor	E0	Malfunction of ODU (uniform)
F1	Malfunction of high-pressure sensor	E1	High-pressure protection
F3	Malfunction of low-pressure sensor	E2	Discharge low-temperature protection
F5	Malfunction of discharge temperature sensor of compressor 1	E3	Low-pressure protection
F6	Malfunction of exit-tube temperature sensor	E4	High discharge temperature protection of compressor
F7	Malfunction of humidity sensor	Ed	Drive module low temperature protection

Error Code	Content	Error Code	Content
F8	Malfunction of water temperature sensor	En	Malfunction of System Refrigerant Detection
F9	Malfunction of jumper cap	J0	Protection for other modules
FA	Web address of IDU is abnormal	J1	Over-current protection of compressor 1
FC	Current sensor of compressor 2 is abnormal	J2	Over-current protection of compressor 2
FL	Current sensor of compressor 3 is abnormal	J3	Over-current protection of compressor 3
FE	Current sensor of compressor 4 is abnormal	J4	Over-current protection of compressor 4
FF	Current sensor of compressor 5 is abnormal	J5	Over-current protection of compressor 5
FJ	Current sensor of compressor 6 is abnormal	J6	Over-current protection for compressor 6
FP	Malfunction of DC motor	J7	Gas-mixing protection of 4-way valve
FU	Malfunction of casing top temperature sensor of compressor 1	J8	High pressure ratio protection of system
Fb	Malfunction of casing top temperature sensor of compressor 2	J9	Low pressure ratio protection of system
Fd	Malfunction of exit tube temperature sensor of mode exchanger	JA	Protection because of abnormal pressure
Fn	Malfunction of inlet tube temperature sensor of mode exchanger	JC	Water flow switch protection
b1	Malfunction of outdoor ambient temperature sensor	JL	Protection because high pressure is too low
b2	Malfunction of defrosting temperature sensor 1	JE	Oil-return pipe is blocked
b3	Malfunction of defrosting temperature sensor 2	JF	Oil-return pipe is leaking
b4	Malfunction of liquid temperature sensor of sub-cooler	P0	malfunction of driving board of compressor (uniform)
b5	Malfunction of gas temperature sensor of sub-cooler	P1	Driving board of compressor operates abnormally (uniform)
b6	Malfunction of inlet temp sensor of gas-liquid separator	P2	Voltage protection of driving board power of compressor (uniform)
b7	Malfunction of outlet temp sensor of gas-liquid separator	P3	Reset protection of driving module of compressor
b8	Malfunction of outdoor humidity sensor	P4	Drive PFC protection of compressor
b9	Malfunction of gas temperature sensor of heat exchanger	P5	Over-current protection of inverter compressor
bA	Malfunction of oil-return temperature sensor 1	P6	Drive IPM module protection of compressor
bH	Clock of system is abnormal	P7	Malfunction of drive temperature sensor of compressor
bE	Malfunction of inlet tube temperature sensor of condenser	P8	Drive IPM high temperature protection of compressor
bF	Malfunction of outlet tube temperature sensor of condenser	P9	Desynchronizing protection of inverter compressor
bJ	High-pressure sensor and low-pressure sensor are connected reversely	PA	Malfunction of drive storage chip of compressor
bP	Malfunction of temperature sensor of oil-return 2	PH	High-voltage protection of compressor’s drive DC bus bar
bU	Malfunction of temperature sensor of oil return 3	PC	Drive current detection circuit malfunction of compressor
bb	Malfunction of temperature sensor of oil return 4	PL	Low-voltage protection of compressor’s drive DC bus bar
bd	Malfunction of air inlet temperature sensor of subcooler	PE	Phase-lacking of inverter compressor
bn	Malfunction of liquid inlet temperature sensor of subcooler	PF	Drive charging circuit malfunction of compressor
H0	Malfunction of driving board of fan (uniform)	PJ	Failure startup of inverter compressor
H1	Driving board of fan operates abnormally (uniform)	PP	AC current protection of inverter compressor
H2	Voltage protection of driving board power of fan (uniform)	PU	AC input voltage of drive of inverter compressor
H3	Reset protection of driving module of fan	G0	PV reversed connection protection
H4	Drive PFC protection of fan	G1	PV Anti-islanding protection

Error Code	Content	Error Code	Content
H5	Over-current protection of inverter fan	G2	PV DC overcurrent protection
H6	Drive IPM module protection of fan	G3	PV power generation overload
H7	Malfunction of drive temperature sensor of fan	G4	PV leakage current protection
H8	Drive IPM high temperature protection of fan	G5	Phase-lacking protection at power grid side
H9	Desynchronizing protection of inverter fan	G6	Phase-lacking protection at power grid side
HA	Malfunction of drive storage chip of inverter outdoor fan	G7	PV LVRT
HH	High-voltage protection of fan's drive DC bus bar	G8	Overcurrent protection at power grid side
HC	Drive current detection circuit malfunction of fan	G9	Drive IPM module protection at power grid side
HL	Low-voltage protection of fan's drive DC bus bar	GA	Low/high input voltage protection at power grid side
HE	Phase-lacking of inverter fan	GH	Photovoltaic DC\DC protection
HF	Drive charging circuit malfunction of fan	GC	Photovoltaic DC hardware overcurrent protection
HJ	Failure startup of inverter fan	GL	Grid side hardware overcurrent protection
HP	AC current protection of inverter fan	GE	High or low photovoltaic voltage protection
HU	AC input voltage of drive of inverter fan	GF	DC bus neutral-point potential unbalance protection
Gd	Grid side current sensor protection	GJ	Grid side module high-temperature protection
Gn	Insulation resistance protection	GP	Grid side temperature sensor protection
Gy	Unrecoverable error of grid drive (photovoltaic)	GU	Charging circuit protection
Gb	Grid side relay protection	—	—

Debugging:

Error Code	Content	Error Code	Content
U0	Preheat time of compressor is insufficient	Cd	Communication malfunction between mode exchanger and ODU
U2	Wrong setting of ODU's capacity code/jumper cap	Cn	Malfunction of network for IDU and ODU of mode exchanger
U3	Power supply phase sequence protection	Cy	Communication malfunction of mode exchanger
U4	Refrigerant-lacking protection	C0	Communication malfunction between IDU, ODU and IDU's wired controller
U5	Wrong address for driving board of compressor	C1	Communication malfunction between main control and DC-DC controller
U6	Alarm because valve is abnormal	C2	Communication malfunction between main control and inverter compressor driver
U7	Power grid DRED0 response protection	C3	Communication malfunction between main control and inverter fan driver
U8	Short-circuit malfunction of IDU	C4	Malfunction of lack of IDU
U9	Malfunction of pipe-line for ODU	C5	Alarm because project code of IDU is inconsistent
UA	DC bus overvoltage protection at power grid side	C6	Alarm because ODU quantity is inconsistent
UH	DC bus undervoltage protection at power grid side	C7	Abnormal communication of converter
UC	Setting of main IDU is successful	C8	Emergency status of compressor
UL	Emergency operation DIP switch code of compressor is wrong	C9	Emergency status of fan
UE	Charging of refrigerant is invalid	CA	Emergency status of module
UF	Identification malfunction of IDU of mode exchanger	CH	Rated capacity is too high
UJ	FO protection for PV module	CC	Malfunction of lack of main control unit

Error Code	Content	Error Code	Content
Ud	Grid-connected driver board error	CL	Rated capacity is too low
Un	Communication malfunction between main control and inverter	CE	Communication malfunction between mode exchanger and IDU
Uy	Over-temperature protection for PV module	CF	Malfunction of multiple main control units
CU	Communication malfunction between IDU and the receiving lamp plate	CJ	Address DIP switch code of system is shocking
Cb	Overflow distribution of IP address	CP	Malfunction of multiple main wired controllers

Status:

Error Code	Content	Error Code	Content
A0	Unit waiting for debugging	n0	SE operation setting of system
A2	Refrigerant recovery operation of after-sales	n3	Compulsory defrosting
A3	Defrosting	n4	Limit setting for max. capacity/output capacity
A4	Oil-return	n5	Compulsory excursion of engineering code of IDU
A6	Heat pump function setting	n6	Inquiry of malfunction
A7	Quiet mode setting	n7	Inquiry of parameters
A8	Vacuum pump mode	n8	Inquiry of project code of IDU
AH	Heating	n9	Check quantity of IDU on line
AC	Cooling	nA	Heat pump unit
AL	Charging refrigerant automatically	nH	Heating only unit
AE	Charging refrigerant manually	nC	Cooling only unit
AF	Fan	nE	Negative sign code
AJ	Alarm for cleaning filter	nF	Fan model
AP	Debugging confirmation for startup of unit	nJ	High temperature prevention when heating
AU	Long-distance emergency stop	nU	Eliminate the long-distance shielding command of IDU
Ab	Emergency stop of operation	nb	Bar code inquiry
Ad	Limit operation	nn	Length modification of connection pipe of ODU
An	Child lock status	Ay	Shielding status

8 Maintenance and Care

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

8.1 Outdoor Heat Exchanger

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

8.2 Drain Pipe

Please check regularly whether drain pipe is blocked or not. Make sure condensate can be drained out smoothly.

8.3 Notice before Seasonal Use

(1) Check whether air inlets and air outlets of indoor and outdoor units are blocked.

(2) Check whether ground connection is reliable or not.

(3) Check whether batteries in the remote controller are replaced or not.

(4) Check whether air filter is properly installed.

(5) If unit starts up after not operating for a long time, it should be power on 8 hours before operation starts so as to preheat the outdoor compressor.

(6) Check whether outdoor unit is securely installed. If there is any problem, please contact Gree authorized service center.

8.4 Maintenance after Seasonal Use

(1) Disconnect power of the entire system.

(2) Clean the air filter and outer case of indoor and outdoor units.

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

(4) If outdoor unit has rust, please apply some paint to it so as to prevent the rust from growing.

8.5 Parts Replacement

Parts and components can be obtained from nearby Gree office or Gree distributor.

8.6 About the Shut off Valve

(1) In the event of any power outage (excluding grid faults), the shut-off valve defaults to closed (can use Capacitor, Battery, etc., as Backup power).

(2) The shut-off valves are triggered by the leak detection system. After the outdoor unit reports an abnormal system refrigerant detection error, the gas pipe shut-off valve and the liquid pipe shut-off valve are handled according to the [System Refrigerant Detection Abnormal Error] procedure.

(3) The shut-off valve has been welded to the gas pipe and liquid pipe inside the unit, so there is no need for the user to install it separately. The refrigerant can be released in the charge amount “mrl” as specified in the indoor unit instruction manual.

(4) For the leak detection system, the shut-off valve cannot reset before the room is ventilated.

(5) The shut-off valve must be replaced when it fails or reaches the end of its service life. Only authorized personnel can replace the shut-off valve.

⚠WARNING When you are conducting air tightness test and leakage test, do not mix oxygen, C_2H_2 or other dangerous gas into the refrigerant circuit. Otherwise, it may lead to danger. Use nitrogen or refrigerant to conduct the tests.

8.7 About the Refrigerant Leakage Sensor

(1) The sensor has a lifetime of 15 years. At the end of lifetime or when the sensor fault, the indoor unit or wired controller displays error code "yd", and emits an alarm sound. Measures will be taken automatically to prevent refrigerant leakage while the sensor fault.

The indoor fan will keep running to form ventilation airflow. The outdoor unit compressor will keep running for several minutes to recycle the refrigerant to the outdoor unit. Then the compressor will stop and the shut-off valves of outdoor unit will close so the refrigerant can not keep leaking.

The alarm can be canceled by operating the “On/Off” button of the wired controller or remote

control. The indoor unit fan will keep running and the system can not operate until the sensor is replaced. Please contact our designated dealer or local service center to replace the sensor.

(2) When the sensor detects refrigerant leak, the indoor unit or wired controller displays error code "yb", and emits an alarm sound. Measures will be taken automatically to reduce the refrigerant concentration in the room.

The indoor fan will keep running to form ventilation airflow. The outdoor unit compressor will keep running for several minutes to recycle the refrigerant to the outdoor unit. Then the compressor will stop and the shut-off valves of outdoor unit will close so the refrigerant can not keep leaking.

The alarm can be canceled by operating the "On/Off" button of the wired controller or remote control. The indoor unit fan will keep running and the system can not operate until the leakage is repaired. Please contact our designated dealer or local service center.

⚠WARNING

(1) The R32 refrigerant leakage sensor must be replaced after malfunction or at the end of its lifetime. ONLY authorized persons may replace the sensor. Only refrigerant leakage sensor of the specified manufacturer can be used.

(2) The R32 refrigerant leakage sensor is a semiconductor detector which may incorrectly detect substances other than R32 refrigerant. Avoid using chemical substances (e.g. organic solvents, hair spray, paint) in high concentrations, in the close proximity of the indoor unit because this may cause misdetection of the R32 refrigerant leakage sensor.

(3) High humidity environment will cause the R32 refrigerant leakage sensor fault, avoid installing indoor unit in high humidity environment or generating high temperature steam near indoor unit.

9 Unventilated Areas

⚠WARNING The non-FIXED APPLIANCE shall be stored in an area where the room size corresponds to the room area as specified for operation.

⚠WARNING The non-FIXED APPLIANCE shall be stored in a room without continuously operating open flames (for example an operating gas appliance) or other POTENTIAL IGNITION SOURCES (for example an operating electric heater, hot surfaces).

⚠WARNING If appliances with A2L REFRIGERANTS connected via an air duct system to one or more rooms are installed in a room with an area less than Amin, that room shall be without continuously operating open flames (for example an operating gas appliance) or other POTENTIAL IGNITION SOURCES (for example an operating electric heater, hot surfaces). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest.

⚠WARNING Auxiliary devices which may be a POTENTIAL IGNITION SOURCE shall not be installed in the duct work. Examples of such POTENTIAL IGNITION SOURCES are hot surfaces with a temperature exceeding 648°C and electric switching devices.

⚠WARNING That only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork. The manufacturer can list in the instructions all approved auxiliary devices by the manufacturer and model number for use with the specific appliance, if those devices have a potential to become an ignition source.

10 Qualification of Worker

The manual shall contain specific information about the required qualification of the working personnel for maintenance, service and repair operations. Every working procedure that affects safety means shall only be carried out by competent persons. The training of these procedures is carried out by national training organizations or manufacturers that are accredited to teach the relevant national competency standards that may be set in legislation. The achieved competence should be documented by a certificate.

Examples for such working procedures are:

(1) breaking into the refrigerating circuit;

(2) opening of sealed components;

(3) opening of ventilated enclosures.

11 Transportation, Marking and Storage for Units that Employ Flammable Refrigerants

11.1 General

The following information is provided for units that employ FLAMMABLE REFRIGERANTS.

11.2 Transport of Equipment Containing Flammable Refrigerants

Attention is drawn to the fact that additional transportation regulations may exist with respect to equipment containing flammable gas. The maximum number of pieces of equipment or the configuration of the equipment permitted to be transported together will be determined by the applicable transport regulations.

11.3 Marking of Equipment Using Signs

Signs for similar appliances used in a work area are generally addressed by local regulations and give the minimum requirements for the provision of safety and/ or health signs for a work location.

All required signs are to be maintained and employers should ensure that employees receive suitable and sufficient instruction and training on the meaning of appropriate safety signs and the actions that need to be taken in connection with these signs.

The effectiveness of signs should not be diminished by too many signs being placed together.

Any pictograms used should be as simple as possible and contain only essential details.

11.4 Disposal of Equipment Using Flammable Refrigerants

See national regulations.

11.5 Storage of Equipment/Appliances

The storage of the appliance should be in accordance with the applicable regulations or instructions, whichever is more stringent.

11.6 Storage of Packed (Unsold) Equipment

Storage package protection should be constructed in such a way that mechanical damage to the equipment inside the package will not cause a leak of the REFRIGERANT CHARGE.

The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.

12 Information on Servicing

12.1 General

The manual shall contain specific information for service personnel according to 12.2 to 12.10.

12.2 Checks to the Area

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the REFRIGERATING SYSTEM, 12.3 to 12.7 shall be completed prior to conducting work on the system.

12.3 Work Procedure

Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.

12.4 General Work Area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

12.5 Checking for Presence of Refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

12.6 Presence of Fire Extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

12.7 No Ignition Sources

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can

possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.

12.8 Ventilated Area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

12.9 Checks to the Refrigerating Equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance. The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

(1) The actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
(2) The ventilation machinery and outlets are operating adequately and are not obstructed;
(3) If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
(4) Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
(5) Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

12.10 Checks to Electrical Devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised. Initial safety checks shall include:

(1) That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
(2) That no live electrical components and wiring are exposed while charging, recovering or purging the system;
(3) That there is continuity of earth bonding.

⚠WARNING Only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork for duct connected appliances,

false ceilings or drop ceilings may be used as a return air plenum if a REFRIGERANT DETECTION SYSTEM is provided in the appliance and any external connections are also provided with a sensor immediately below the return air plenum duct joint.

12.11 Pipe Installation

That pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

That after completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected.

The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system, cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.

13 Sealed Electrical Components shall be Replaced

14 Intrinsically Safe Components must be Replaced

15 Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

16 Detection of Flammable Refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

NOTICE Examples of leak detection fluids are:

(1) Bubble method.

(2) Fluorescent method agents.

If a leak is suspected, all naked flames shall be removed/extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to Clause 17.

17 Removal and Evacuation

When breaking into the refrigerant circuit to make repairs-or for any other purpose-conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to: The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times.

– safely remove refrigerant following local and national regulations;

– evacuate;

– purge the circuit with inert gas (optional for A2L);

– evacuate (optional for A2L);

– continuously flush or purge with inert gas when using flame to open circuit;

and

– open the circuit.

Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

18 Charging Procedures

In addition to conventional charging procedures, the following requirements shall be followed.

(1) Ensure that contamination of different refrigerants does not occur when using charging equipment.

(2) Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.

(3) Cylinders shall be kept in an appropriate position according to the instructions.

(4) Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.

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

(6) Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

19 Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely.

Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

(1) Become familiar with the equipment and its operation.

(2) Isolate system electrically.

(3) Before attempting the procedure, ensure that:

1) Mechanical handling equipment is available, if required, for handling refrigerant cylinders;

2) All personal protective equipment is available and being used correctly;

3) The recovery process is supervised at all times by a competent person;

4) Recovery equipment and cylinders conform to the appropriate standards.

(4) Pump down refrigerant system, if possible.

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

(6) Make sure that cylinder is situated on the scales before recovery takes place.

(7) Start the recovery machine and operate in accordance with instructions.

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

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

(10) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

(11) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

20 Labeling

Equipment shall be labeled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

21 Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders. If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

22 After-sales Service

If there’s quality defect or other problems in the product, please contact Gree local after-sales service department for help.

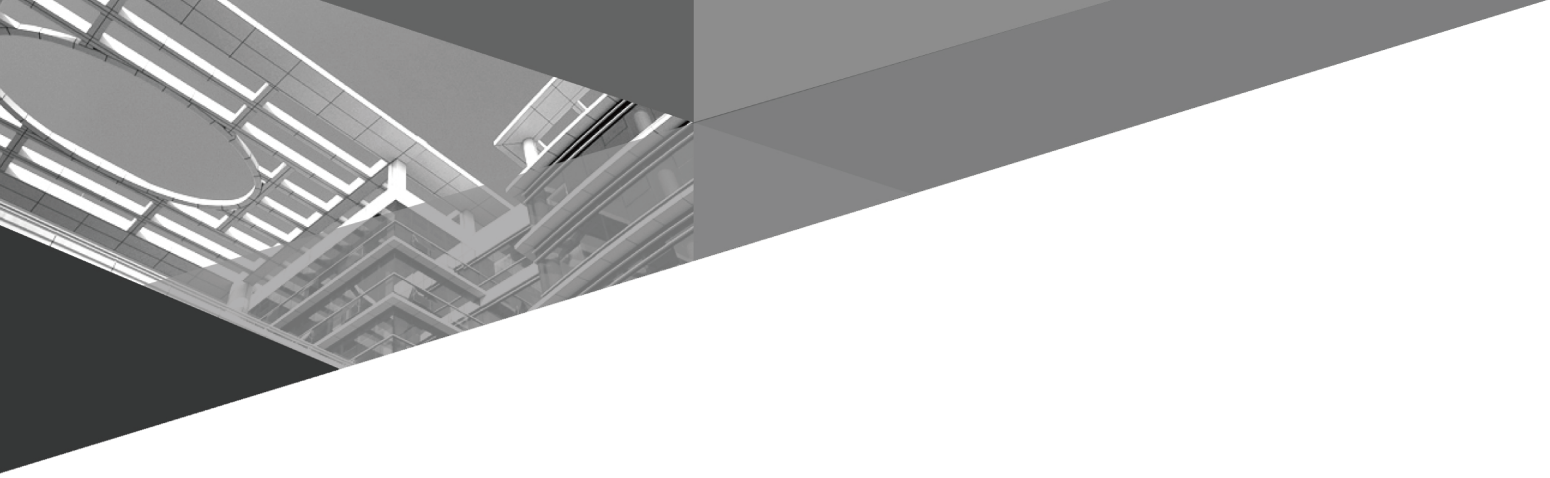
Warranty must be based on the following conditions:

(1) Product’s initial startup must be performed by professional technicians from Gree service center or persons assigned by Gree.

(2) Only Gree spare parts are used.

(3) All instructions of unit operation and maintenance in this manual must be strictly followed according to set period and set frequency.

(4) Any breach of the above conditions will disable the warranty.



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