

**DAIKIN**



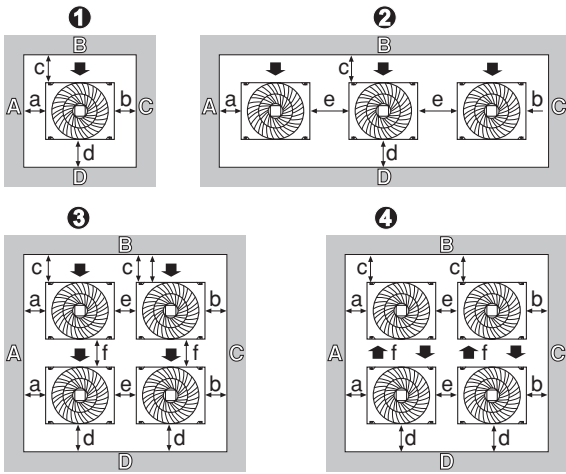
# INSTALLATION MANUAL

## **VRV II** System air conditioner

RXQ5M9W1B  
RXQ8M9W1B  
RXQ10M9W1B

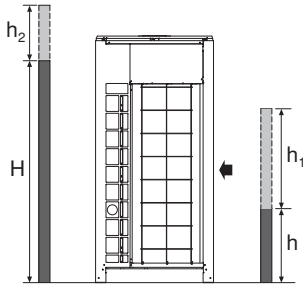
RXYQ5M9W1B  
RXYQ8M9W1B  
RXYQ10M9W1B  
RXYQ12M9W1B  
RXYQ14M9W1B  
RXYQ16M9W1B

RXYQ18M9W1B  
RXYQ20M9W1B  
RXYQ22M9W1B  
RXYQ24M9W1B  
RXYQ26M9W1B  
RXYQ28M9W1B  
RXYQ30M9W1B  
RXYQ32M9W1B  
RXYQ34M9W1B  
RXYQ36M9W1B  
RXYQ38M9W1B  
RXYQ40M9W1B  
RXYQ42M9W1B  
RXYQ44M9W1B  
RXYQ46M9W1B  
RXYQ48M9W1B

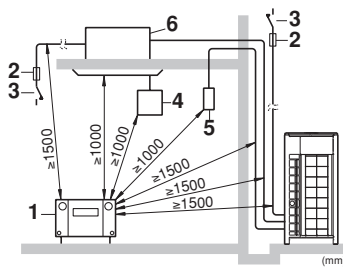


		①	②	③	④
<b>A+B+C+D</b>	I)*	$c \geq 300 \text{ mm}$	$a \geq 10 \text{ mm}$ $b \geq 10 \text{ mm}$ $d \geq 500 \text{ mm}$	$c \geq 500 \text{ mm}$ $a \geq 10 \text{ mm}$ $b \geq 10 \text{ mm}$ $d \geq 500 \text{ mm}$	
			$e \geq 20 \text{ mm}$	$f \geq 600 \text{ mm}$	$f \geq 900 \text{ mm}$
<b>A+B</b>	II)*	$c \geq 100 \text{ mm}$	$a \geq 50 \text{ mm}$ $b \geq 50 \text{ mm}$ $d \geq 500 \text{ mm}$	$c \geq 500 \text{ mm}$ $a \geq 50 \text{ mm}$ $b \geq 50 \text{ mm}$ $d \geq 500 \text{ mm}$	
			$e \geq 100 \text{ mm}$	$f \geq 500 \text{ mm}$	$f \geq 600 \text{ mm}$
	III)		$a \geq 200 \text{ mm}$ $c \geq 300 \text{ mm}$		
			$e \geq 400 \text{ mm}$		

\*  $H > 1500 \text{ mm} \Rightarrow d \geq d+(h_2/2)$   
 $h > 500 \text{ mm} \Rightarrow c \geq c+(h_1/2)$



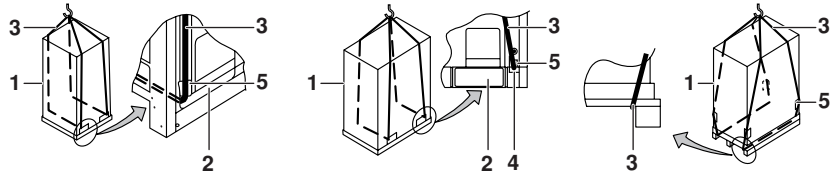
1



RXYQ5

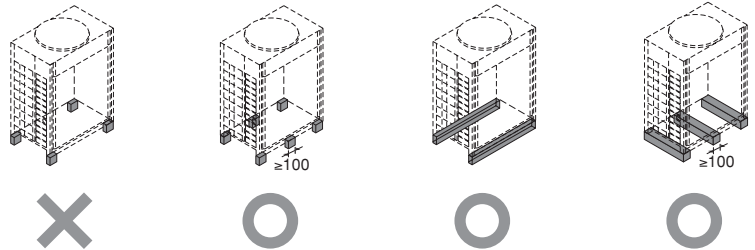
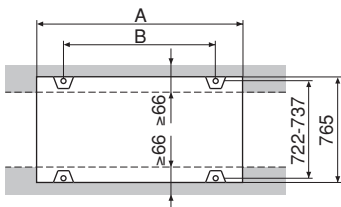
RXYQ8+10

RXYQ12-16



2

3

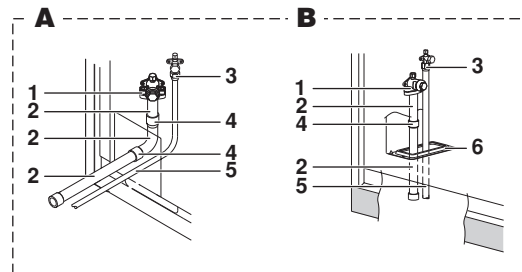
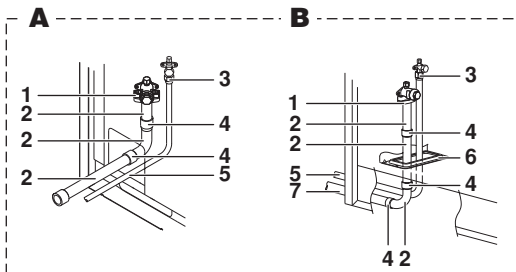


4

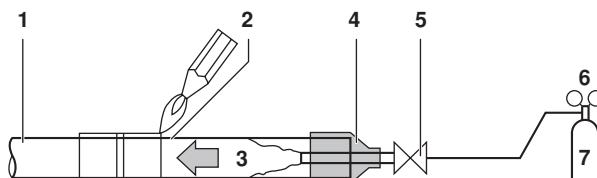
5

RXYQ5-16

RXYQ18-48

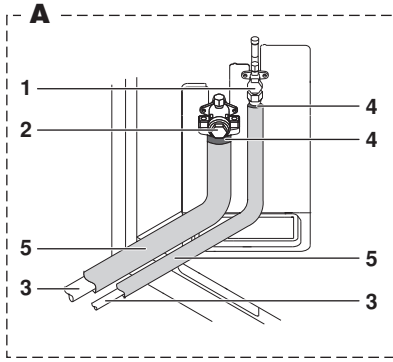


6

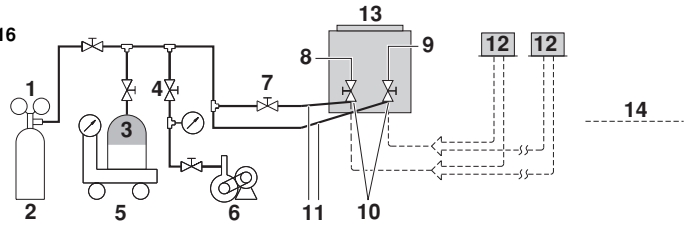


7

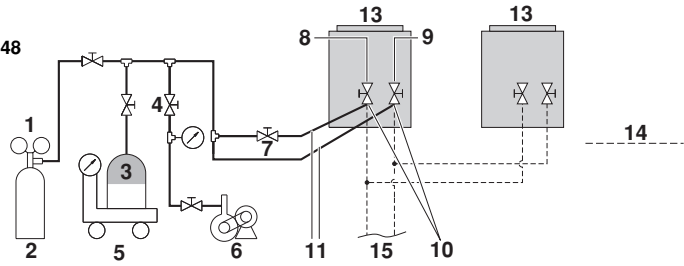
RX(Y)Q5~16



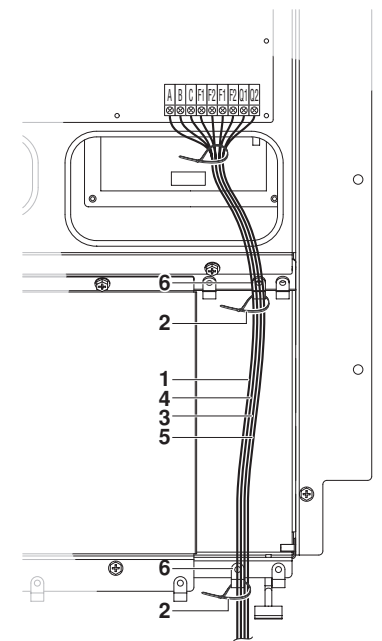
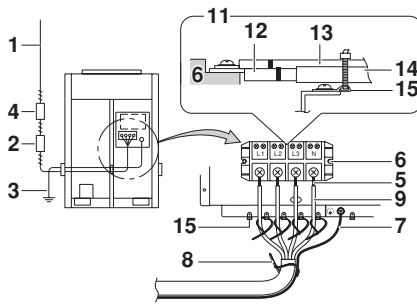
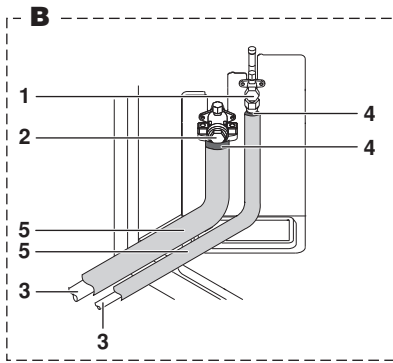
RX(Y)Q5~16



RX(Y)Q18~48

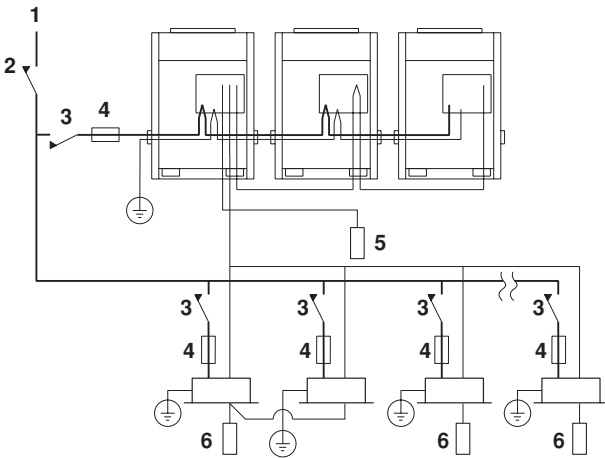


RX(Y)Q18~48



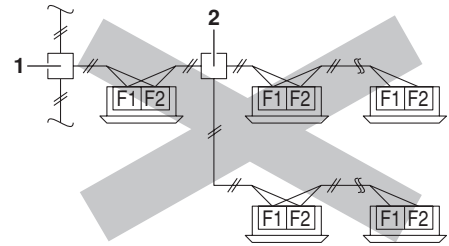
8

10

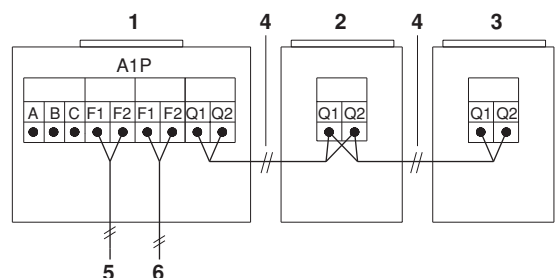
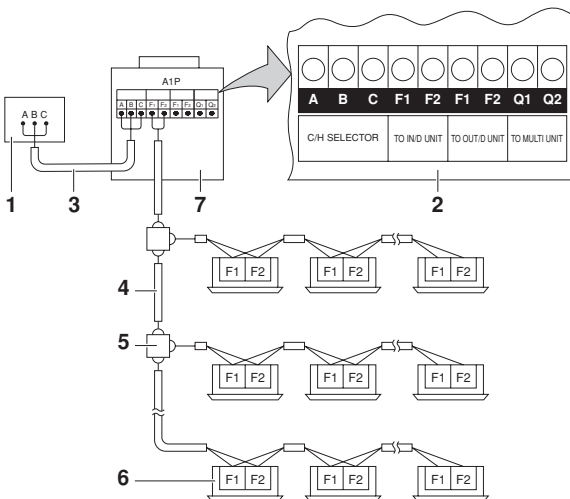


12

11

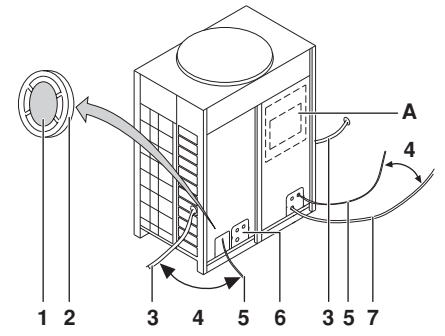
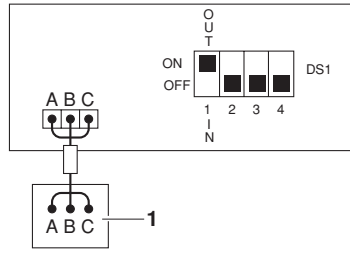
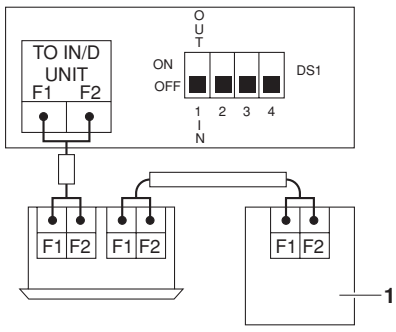


13



14

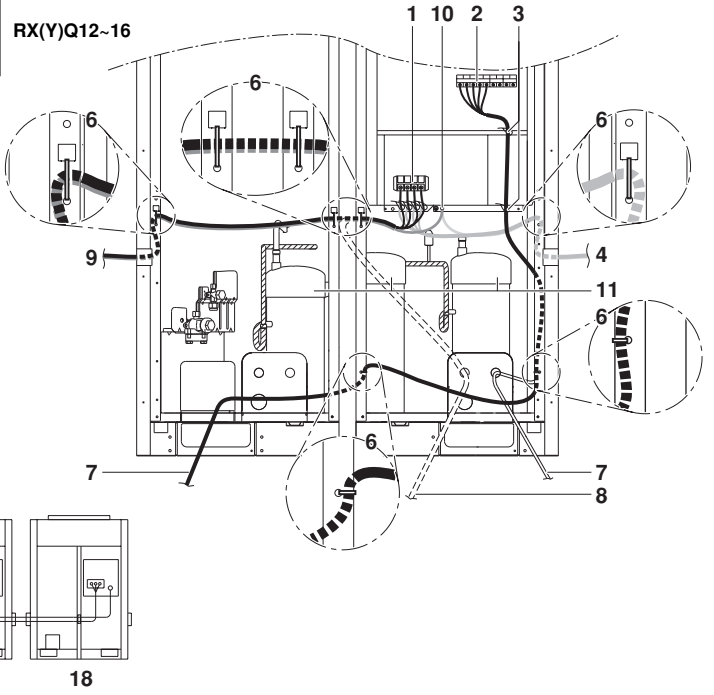
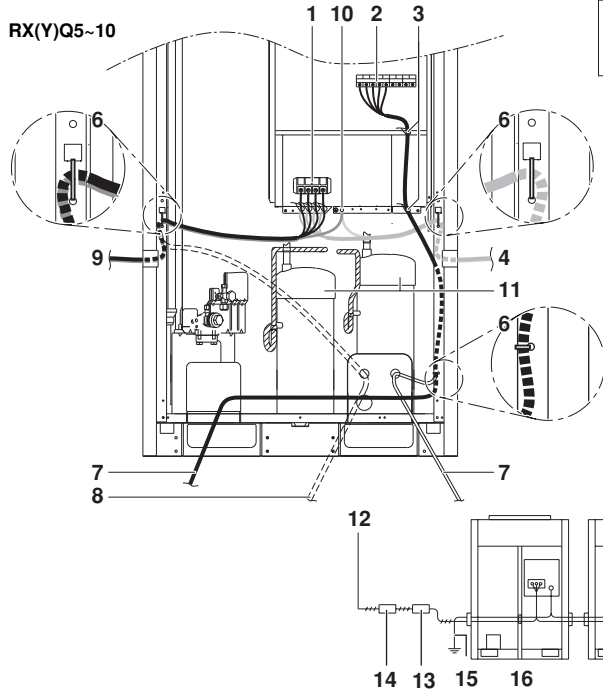
15



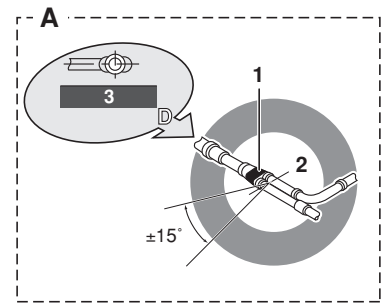
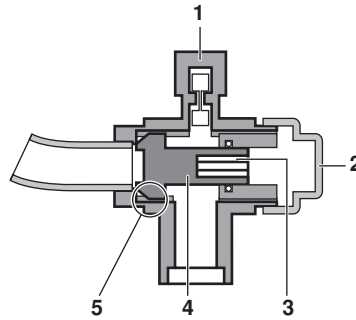
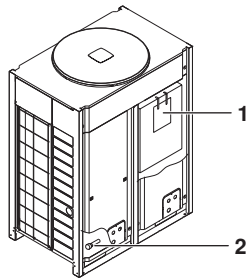
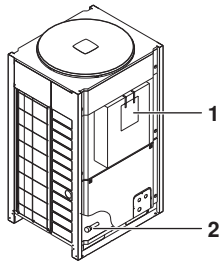
16

17

18

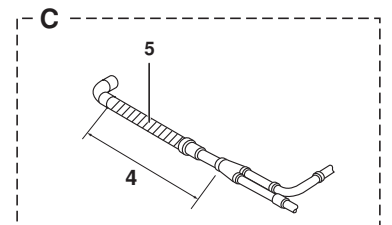
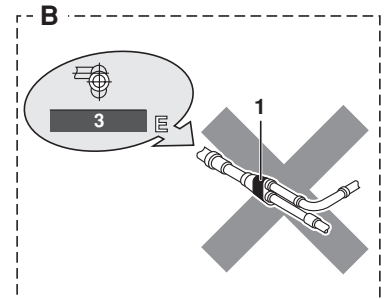
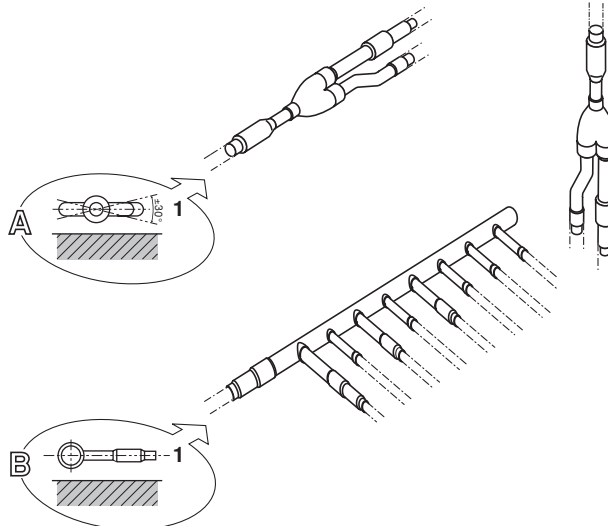


19



20

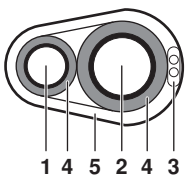
21



22

23

24







CONTENTS

	Page
1. Introduction.....	1
1.1. Combination.....	1
1.2. Standard supplied accessories.....	2
1.3. Optional accessories.....	2
1.4. Technical and Electrical specifications.....	2
2. Main components.....	2
3. Selection of location.....	2
4. Inspecting and handling the unit.....	3
5. Unpacking and placing the unit.....	3
6. Refrigerant piping.....	4
6.1. Selection of piping material.....	4
6.2. Connecting the refrigerant piping.....	4
6.3. Example of connection.....	8
6.4. Leak test and vacuum drying.....	10
6.5. Pipe insulation.....	10
6.6. Checking of unit and installation conditions.....	10
6.7. Stop valve operation procedure.....	10
6.8. Additional refrigerant charge.....	11
7. Field wiring.....	12
7.1. Internal wiring – Parts table.....	12
7.2. Optional parts cool/heat selector.....	13
7.3. Power circuit and cable requirements.....	13
7.4. General cautions.....	13
7.5. Examples.....	14
8. Before operation.....	16
8.1. Service precautions.....	16
8.2. Checks before initial start-up.....	16
8.3. Field setting.....	17
8.4. Test operation.....	19
8.5. Temperature adjustment operation confirmation.....	20
9. Service mode operation.....	20
10. Caution for refrigerant leaks.....	20
11. Disposal requirements.....	21



READ THIS MANUAL ATTENTIVELY BEFORE STARTING UP THE UNIT. DO NOT THROW IT AWAY. KEEP IT IN YOUR FILES FOR FUTURE REFERENCE.

IMPROPER INSTALLATION OR ATTACHMENT OF EQUIPMENT OR ACCESSORIES COULD RESULT IN ELECTRIC SHOCK, SHORT-CIRCUIT, LEAKS, FIRE OR OTHER DAMAGE TO THE EQUIPMENT. BE SURE ONLY TO USE ACCESSORIES MADE BY DAIKIN WHICH ARE SPECIFICALLY DESIGNED FOR USE WITH THE EQUIPMENT AND HAVE THEM INSTALLED BY A PROFESSIONAL.

DAIKIN EQUIPMENT IS DESIGNED FOR COMFORT APPLICATIONS. FOR USE IN OTHER APPLICATIONS, PLEASE CONTACT YOUR LOCAL DAIKIN DEALER.

IF UNSURE OF INSTALLATION PROCEDURES OR USE, ALWAYS CONTACT YOUR DEALER FOR ADVICE AND INFORMATION.

THIS AIR CONDITIONER COMES UNDER THE TERM "APPLIANCES NOT ACCESSIBLE TO THE GENERAL PUBLIC".



The refrigerant R-410A requires strict cautions for keeping the system clean, dry and tight.

- Clean and dry  
Foreign materials (including mineral oils such as SUNISO oil or moisture) should be prevented from getting mixed into the system.
- Tight  
R-410A does not contain any chlorine, does not destroy the ozone layer, and does not reduce the earth's protection against harmful ultraviolet radiation. R-410A can contribute slightly to the greenhouse effect if it is released. Therefore we should take special attention to check the tightness of the installation.

Read "6. Refrigerant piping" on page 4 carefully and follow these procedures correctly.



Since design pressure is 4.0 MPa or 40 bar (for R-407C units: 3.3 MPa or 33 bar), pipes of larger wall thickness may be required. Refer to paragraph "6.1. Selection of piping material" on page 4.

1. INTRODUCTION

This installation manual concerns VRV inverters of the Daikin RX(Y)Q-M9 series. These units are designed for outdoor installation and used for cooling and heatpump applications. The RXQ-M9-series consist of 3 main stand-alone units and has nominal cooling capacities ranging from 14.0 to 28.0 kW. The RXYQ-M9-series can be combined from 6 main units and has nominal capacities ranging from 14.0 to 135 kW and nominal heating capacities ranging from 16.0 to 150 kW.

The RX(Y)Q-M9 units can be combined with Daikin VRV indoor units for air conditioning purposes, and suitable for R-410A.

The present installation manual describes the procedures for unpacking, installing and connecting the RX(Y)Q-M9 units. Installation of the indoor units is not described in this manual. Always refer to the installation manual supplied with these units for their installation.

1.1. Combination

The indoor units can be installed in the following range.




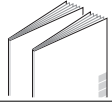

- Always use appropriate indoor units compatible with R-410A. To learn which models of indoor units are compatible with R-410A, refer to the product catalogs.
- Pay attention when connecting outdoor units in multi combination. RXYQ-M units are NOT compatible with RXYQ-M9 units.

■ Total capacity/quantity of indoor units

Outdoor unit		Total capacity of indoor units	Total quantity of indoor units
RX(Y)Q5	(*)	62.5 ~ 162.5	8
RX(Y)Q8	(*)	100 ~ 260	13
RX(Y)Q10	(*)	125 ~ 325	16
RXYQ12	(*)	150 ~ 390	19
RXYQ14	(*)	175 ~ 455	20
RXYQ16	(*)	200 ~ 520	20
RXYQ18		225 ~ 585	20
RXYQ20		250 ~ 650	20
RXYQ22		275 ~ 715	22
RXYQ24		300 ~ 780	32
RXYQ26		325 ~ 845	32
RXYQ28		350 ~ 910	32
RXYQ30		375 ~ 975	32
RXYQ32		400 ~ 1040	32
RXYQ34		425 ~ 1105	34
RXYQ36		450 ~ 1170	36
RXYQ38		475 ~ 1235	38
RXYQ40		500 ~ 1300	40
RXYQ42		525 ~ 1365	40
RXYQ44		550 ~ 1430	40
RXYQ46		575 ~ 1495	40
RXYQ48		600 ~ 1560	40

(\*) = main unit

### 1.2. Standard supplied accessories

	RX(Y)Q5	RX(Y)Q8+10 RXYQ12~16	
Gas line piping (1)	—	1	
Gas line piping (2)	—	1	
Gas line piping (3)	—	1	
Installation manual	1	1	
Operation manual	1	1	
Additional refrigerant charge label	1	1	

Refer to figure 20.

- 1 Installation and operational manual
- 2 Accessory pipes

### 1.3. Optional accessories

To install the above outdoor units, the following optional parts are also required.

- Refrigerant branching kit (for R-410A only: Always use an appropriate kit dedicated for your system.)

Refnet header	Refnet joint
KHRQ22M29H	KHRQ22M20T
KHRQ22M64H	KHRQ22M29T
KHRQ22M75H	KHRQ22M64T
—	KHRQ22M75T

- Outdoor unit multi connection piping kit (For R-410A only: Always use an appropriate kit dedicated for your system.)

Number of outdoor units connected	
2	3
BHFQ22M909	BHFQ22M1359

To select an optimum refrigerant branching kit, refer to "6. Refrigerant piping" on page 4.

### 1.4. Technical and Electrical specifications

Refer to the Engineering Data Book for the complete list of specifications.

## 2. MAIN COMPONENTS

For main components and function of the main components, refer to the Engineering Data Book.

## 3. SELECTION OF LOCATION

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.




This unit, both indoor and outdoor, is suitable for installation in a commercial and light industrial environment. If installed as a house-hold appliance it could cause electromagnetic interference.

The inverter units should be installed in a location that meets the following requirements:

- 1 The foundation is strong enough to support the weight of the unit and the floor is flat to prevent vibration and noise generation. If not, the unit may fall over and cause injury.
- 2 The space around the unit is adequate for servicing and the minimum space for air inlet and air outlet is available. (Refer to figure 1 and choose one of the possibilities).

In case of an installation site where only the sides A+B have obstacles, the wall heights have no influence on any indicated service space dimensions.

**A B C D** Sides along the installation site with obstacles

 Suction side

- 3 There is no danger of fire due to leakage of inflammable gas.
- 4 Ensure that water cannot cause any damage to the location in case it drips out the unit (e.g. in case of a blocked drain pipe).
- 5 The piping length between the outdoor unit and the indoor unit may not exceed the allowable piping length. (Refer to "6.3. Example of connection" on page 8)
- 6 Select the location of the unit in such a way that neither the discharged air nor the sound generated by the unit disturb anyone.
- 7 Make sure that the air inlet and outlet of the unit are not positioned towards the main wind direction. Frontal wind will disturb the operation of the unit. If necessary, use a windscreen to block the wind.
- 8 Do not install or operate the unit on locations where air contains high levels of salt, like e.g. in the vicinity of oceans. (Refer for further information to the engineering databook).
- 9 During installation, avoid the possibility that children can climb on the unit or place objects on the unit.  
Falls may result in injury.

- 10 When installing the unit in a small room, take measures in order to keep the refrigerant concentration from exceeding allowable safety limits in the event of a refrigerant leak.

Excessive refrigerant concentrations in a closed room can lead to oxygen deficiency.



- The equipment described in this manual may cause electronic noise generated from radio-frequency energy. The equipment complies to specifications that are designed to provide reasonable protection against such interference. However, there is no guarantee that interference will not occur in a particular installation. It is therefore recommended to install the equipment and electric wires keeping proper distances away from stereo equipment, personal computers, etc... (See figure 2).

- Personal computer or radio
- Fuse
- Earth leakage breaker
- Remote controller
- Cool/heat selector
- Indoor unit

In extreme circumstances you should keep distances of 3 m or more and use conduit tubes for power and transmission lines.

- In heavy snowfall areas, select an installation site where snow will not affect operation of the unit.
- The refrigerant R-410A itself is nontoxic, nonflammable and is safe. If the refrigerant should leak however, its concentration may exceed the allowable limit depending on room size. Due to this it could be necessary to take measures against leakage. Refer to the chapter "10. Caution for refrigerant leaks" on page 20.
- Do not install in the following locations.
  - Locations where sulfurous acids and other corrosive gases may be present in the atmosphere. Copper piping and soldered joints may corrode, causing refrigerant to leak.
  - Locations where equipment that produces electromagnetic waves is found. The electromagnetic waves may cause the control system to malfunction, preventing normal operation.
  - Locations where flammable gases may leak, where thinner, gasoline, and other volatile substances are handled, or where carbon dust and other incendiary substances are found in the atmosphere. Leaked gas may accumulate around the unit, causing an explosion.
- When installing, take strong winds, typhoons or earthquakes into account. Improper installation may result in fall over of the unit.

#### 4. INSPECTING AND HANDLING THE UNIT

At delivery, the package should be checked and any damage should be reported immediately to the carrier claims agent.

When handling the unit, take into account the following:

- Fragile, handle the unit with care.
   
 Keep the unit upright in order to avoid compressor damage.
- Choose on beforehand the path along which the unit is to be brought in.
- Lift the unit preferably with a crane and 2 belts of at least 8 m long.
- When lifting the unit with a crane, always use protectors to prevent belt damage and pay attention to the position of the unit's centre of gravity.

**NOTE** Use a belt sling of  $\leq 20$  mm wide that adequately bears the weight of the unit.



- 5 Bring the unit as close to its final installation position in its original package to prevent damage during transport. (See figure 3)

- Packaging material
- Opening (large)
- Belt sling
- Opening (small)(40x30)
- Protector

#### 5. UNPACKING AND PLACING THE UNIT

- Remove the four screws fixing the unit to the pallet.
- Make sure the unit is installed level on a sufficiently strong base to prevent vibration and noise.
- Fasten the unit in place using four anchor bolts M12.
- Make sure the base under the unit is extended more than 765 mm behind the unit.
- The unit must be installed on a solid longitudinal foundation (steelbeam frame or concrete) as indicated in figure 4.

Model	A	B
RX(Y)Q5	635	497
RX(Y)Q8+10	930	792
RXYQ12-16	1240	1102

- Support the unit with a foundation of 66 mm wide or more. (The support leg of the unit is 66 mm wide).

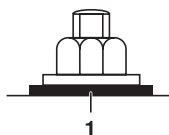


Do not use stands to support the corners. (See figure 5)

- X Not allowed
- O Allowed



- Prepare a water drainage channel around the foundation to drain waste water from around the unit.
- If the unit is to be installed on a roof, check the strength of the roof and its drainage facilities first.
- If the unit is to be installed on a frame, install the waterproofing board within a distance of 150 mm under the unit in order to prevent infiltration of water coming from under the unit.
- When installed in a corrosive environment, use a nut with resin clip plate to protect the nut tightening part from rust.

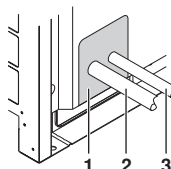


1 Resin clip plate

#### PRECAUTION

Block all gaps in the holes for passing out piping and wiring using sealing material (field supply). (Small animals may enter the machine.)

Example: passing piping out through the front



- Plug the areas marked with "■". (When the piping is routed from the front panel.)
- Gas side piping
- Liquid side piping



## 6. REFRIGERANT PIPING



Use R-410A to add refrigerant.

All field piping must be installed by a licensed refrigeration technician and must comply with relevant local and national regulations.

### CAUTION TO BE TAKEN WHEN BRAZING REFRIGERANT PIPING

Do not use flux when brazing copper-to-copper refrigerant piping. (Particularly for the HFC refrigerant piping) Therefore, use the phosphor copper brazing filler metal (BCuP) which does not require flux.

Flux has extremely harmful influence on refrigerant piping systems. For instance, if the chlorine based flux is used, it will cause pipe corrosion or, in particular, if the flux contains fluorine, it will damage the refrigerant oil.

Be sure to perform a nitrogen blow when brazing. (Brazing without performing nitrogen replacement or releasing nitrogen into the piping will create large quantities of oxidized film on the inside of the pipes, adversely affecting valves and compressors in the refrigerating system and preventing normal operation.)

After completing the installation work, check that the refrigerant gas does not leak.

Toxic gas may be produced if the refrigerant gas leaks into the room and when it comes in contact with a source of fire.

Ventilate the area immediately in the event of a leak.

In the event of a leak, do not touch the leaked refrigerant directly. Frostbite may be caused.

#### NOTE

Installation tools:



Make sure to use installation tools (gauge manifold charge hose, etc.) that are exclusively used for R-410A installations to withstand the pressure and to prevent foreign materials (e.g. mineral oils such as SUNISO and moisture) from mixing into the system. (The screw specifications differ for R-410A and R-407C.)

Vacuum pump (use a 2-stage vacuum pump with a non-return valve):

- Make sure the pump oil does not flow oppositely into the system while the pump is not working.

### 6.1. Selection of piping material

- Foreign materials inside pipes (including oils for fabrication) must be 30 mg/10 m or less.
- Use the following material specification for refrigerant piping:
  - Size: determine the proper size referring to chapter "6.3. Example of connection" on page 8.
  - Construction material: phosphoric acid deoxidized seamless copper for refrigerant.
  - Temper grade: use piping with temper grade in function of the pipe diameter as listed in below table.

Pipe Ø	Temper grade of piping material
≤15.9	O
≥19.1	1/2H

O = Annealed  
1/2H = Half hard

- The pipe thickness of the refrigerant piping should comply with relevant local and national regulations. The minimal pipe thickness for R-410A piping must be in accordance with the table below.

Pipe Ø	Minimal thickness t (mm)
6.4	0.80
9.5	0.80
12.7	0.80
15.9	0.99
19.1	0.80

Pipe Ø	Minimal thickness t (mm)
22.2	0.80
28.6	0.99
34.9	1.21
41.3	1.43

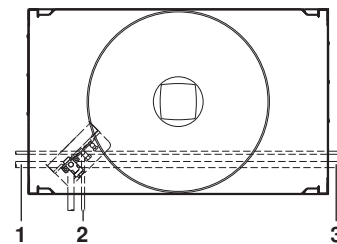
- Make sure to use the particular branches of piping that have been selected referring to chapter "6.3. Example of connection" on page 8.
- In case the required pipe sizes (inch sizes) are not available, it is also allowed to use other diameters (mm sizes), taken the following into account:
  - select the pipe size nearest to the required size.
  - use the suitable adapters for the change-over from inch to mm pipes (field supply).

### 6.2. Connecting the refrigerant piping

- Installation of refrigerant branching kit
 

For installation, refer to the installation manual delivered with the kit. Follow the conditions listed below:

  - Mount the refnet joint so that it branches either horizontally or vertically.
  - Mount the refnet header so that it branches horizontally. (See figure 23)
- Horizontal surface
- Installation of refrigerant piping is possible as front connection or side connection (when taken out from the bottom) as shown in the figure.



- Left-side connection
- Front connection
- Right-side connection

### One outdoor unit installed: In case of RX(Y)Q5~16

- Front connection:  
Remove the stop valve cover to connect. (See figure 6)
  - Side (bottom) connection:  
Remove the knock holes on the bottom frame and route the piping under the bottom frame. (See figure 6)
- A Front connection  
Remove the stop valve cover to connect.
  - B Side (bottom) connection:  
Remove the knock holes on the bottom frame and route the piping under the bottom frame
- 1 Flange (or flare nut in case of models RX(Y)Q5-type)
  - 2 Gas side pipe (1)(2)(3) supplied with the unit. (In case of RX(Y)Q5-type, field supply.)
  - 3 Flare nut
  - 4 Brazing (Except RX(Y)Q5)
  - 5 Liquid side piping (field supply)
  - 6 Knockout hole (use a hammer)
  - 7 Gas side piping (field supply)

### When multiple outdoor units are installed: In case of RXYQ18~48

- Front connection:  
Remove the stop valve cover to connect. (See figure 6)
- Side (bottom) connection:  
Remove the knock holes on the bottom frame and route the piping under the bottom frame. (See figure 6)

To connect the piping between outdoor units, an optional piping kit (multi connection piping kit) is always required. When installing the piping, follow the instructions in the installation manual that comes with the kit.

### Restriction for the installation of the outdoor unit multi connection piping kit

- Install the joint horizontally within a incline of  $\pm 15^\circ$  with the caution nameplate on top. (See figure 24, part A)  
Do not connect it vertically. (See figure 24, part B)
- Reserve the straight part of 500 mm or more for the branch pipe and do not bend the local pipe in that area. A straight part of 500 mm or more can be reserved if a local pipe (straight pipe) of 120 mm or more is connected to the joint. (See figure 24, part C)
- Incorrect installation may cause breakage of the outdoor unit. (See figure 24)

- 1 Caution nameplate
  - 2 Horizontal line
  - 3 Ground
  - 4 Straight part of 500 mm or more
  - 5 Field piping (120 mm long or more)
- Ⓓ D-arrow view  
Ⓔ E-arrow view



- Be sure to use the supplied accessory pipes when carrying out piping work in the field.
- Be sure that the field installed piping does not touch other pipes, the bottom panel or side panel. Especially for the bottom and side connection, be sure to protect the piping with suitable insulation, to prevent it from coming into contact with the casing.

### Precautions when knocking out knock holes

- Be sure to avoid damaging the casing
  - After knocking out the holes, we recommend you paint the edges and areas around the edges using the repair paint to prevent rusting.
  - When passing electrical wiring through the knock holes, wrap the wiring with protective tape to prevent damage.
- 3 Make sure to perform the piping installation within the range of the maximum allowable pipe length, allowable level difference and allowable length after branching as indicated in "6.3. Example of connection" on page 8.
  - 4 For installation of the refrigerant branching kit (Refnet), refer to the installation manual delivered with the kit.
  - 5 Pipe connection
    - Only use the flare nuts included with the unit.  
Using different flare nuts may cause the refrigerant to leak.
    - Be sure to perform a nitrogen blow when brazing.  
(Brazing without performing nitrogen replacement or releasing nitrogen into the piping will create large quantities of oxidised film on the inside of the pipes, adversely affecting valves and compressors in the refrigerating system and preventing normal operation.)

#### NOTE



The pressure regulator for the nitrogen released when doing the brazing should be set to 0.02 MPa or less. (See figure 7)

- 1 Refrigerant piping
- 2 Location to be brazed
- 3 Nitrogen
- 4 Taping
- 5 Manual valve
- 6 Regulator
- 7 Nitrogen



Do not use anti-oxidants when brazing the pipe joints. Residue can clog pipes and break equipment.

- 6 Protection against contamination when installing pipes
  - Take measures to prevent foreign materials like moisture and contamination from mixing into the system.

	Installation period	Protection method
	More than a month	Pinch the pipe
	Less than a month	
	Regardless of the period	Pinch or tape the pipe

- Great caution is needed when passing copper tubes through walls.

### FLARE SHAPE and FLARENUT TIGHTENING TORQUE

#### Precautions when connecting pipes

- See the following table for flare part machining dimensions.
- When connecting the flare nuts, apply refrigerant oil to the inside and outside of the flares and turn them three or four times at first. (Use ester oil or ether oil.)



- 1 Piping union
- 2 Spanner
- 3 Flare nut
- 4 Torque wrench

- When loosening a flare nut, always use two wrenches in combination. When connecting the piping, always use a spanner and torque wrench in combination to tighten the flare nut.

- See the following table for tightening torque.  
(Applying too much torque may cause the flares to crack.)
- After all the piping has been connected, use nitrogen to perform a gas leak check.

Pipe size	Tightening Torque (N·m)	A (mm)	Flare shape
Ø9.5	32.7~39.9	12.8~13.2	
Ø12.7	49.5~60.3	16.2~16.6	
Ø15.9	61.8~75.4	19.3~19.7	



You must use a torque wrench but if you are obliged to install the unit without a torque wrench, you may follow the installation method mentioned below.

**After the work is finished, make sure to check that there is no gas leak.**

When you keep on tightening the flare nut with a spanner, there is a point where the tightening torque suddenly increases. From that position, further tighten the flare nut within the angle shown below:

Pipe size	Further tightening angle	Recommended arm length of tool
Ø9.5 (3/8")	60~90°	±200 mm
Ø12.7 (1/2")	30~60°	±250 mm
Ø15.9 (5/8")	30~60°	±300 mm

### Precautions when selecting branch piping

If the overall equivalent piping length is  $\geq 90$  m, be sure to enlarge the pipe diameter of the liquid-side and gas-side main piping. (This does not apply to RX(Y)Q5 type)

Gas side	
RX(Y)Q5	Ø15.9 → Ø19.1
RX(Y)Q8	Ø19.1 → Ø22.2
RX(Y)Q10	Ø22.2 → Ø25.4
RXYQ12+14	Ø28.6 → Not Increased
RXYQ16~22	Ø28.6 → Ø31.8
RXYQ24	Ø34.9 → Not Increased
RXYQ26~34	Ø34.9 → Ø38.1
RXYQ36~48	Ø41.3 → Not Increased

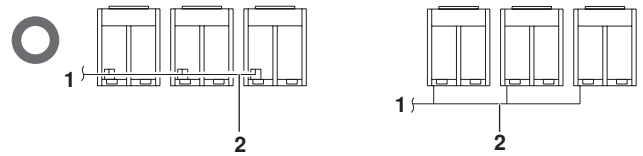
Liquid side	
RX(Y)Q5	Ø9.5 → Not Increased
RX(Y)Q8+10	Ø9.5 → Ø12.7
RXYQ12~16	Ø12.7 → Ø15.9
RXYQ18~24	Ø15.9 → Ø19.1
RXYQ26~48	Ø19.1 → Ø22.2

If the recommended pipe size is not available, stick to the original pipe diameter (which may result in a small capacity decrease).

### Cautions for installation of multiple outdoor units

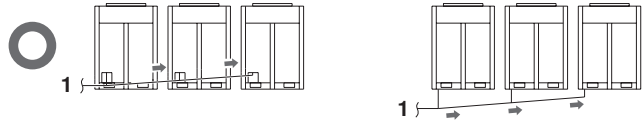
- The piping between the outdoor units must be routed level or slightly upward to avoid the risk of oil detention into the piping side.

#### Pattern 1



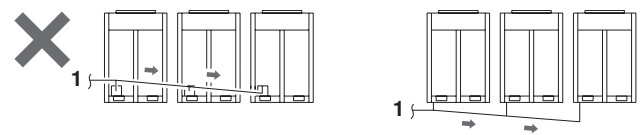
- To indoor unit
- Piping between outdoor units

#### Pattern 2



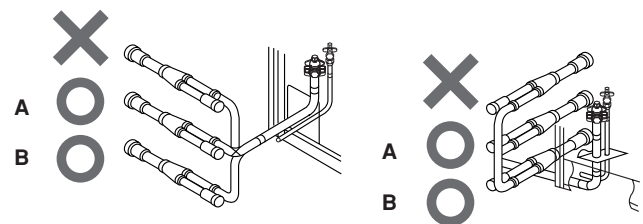
- To indoor unit

#### Prohibited pattern: Change to Pattern 1 or 2

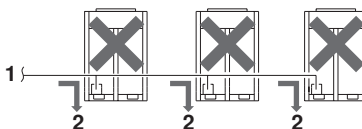


- To indoor unit

- To avoid the risk of oil retention to the stopping unit side, always connect the stop valve and the piping between outdoor units as shown in the figure A or figure B.

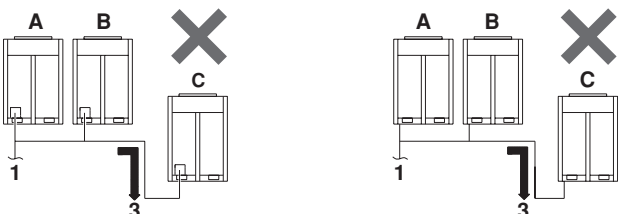


#### Prohibited pattern



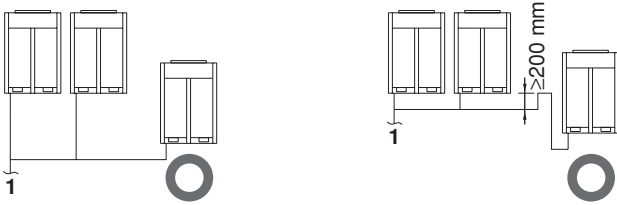
Oil remains in the outdoor unit that stops.

#### Change to pattern 1 or 2



Oil remains in the outdoor unit C when the system stops.

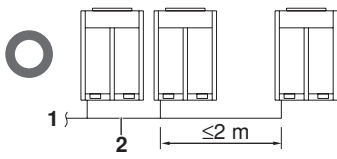
Change as shown in the figure below



- A Unit A
- B Unit B
- C Unit C
- X Not allowed
- O Allowed
- 1 To indoor unit
- 2 Oil collects to the stopping outdoor unit.
- 3 Oil collects to the outdoor unit C when the system stops.

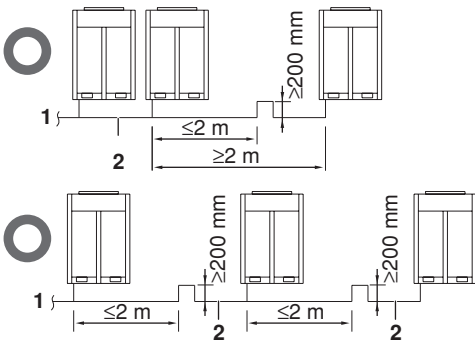
3. If the piping length between the outdoor unit-connecting pipe kits or between the outdoor units exceeds 2 m, create a rise of 200 mm or more in the gas line within a length of 2 m from the kit.

■ If  $\leq 2$  m



- 1 To indoor unit
- 2 Piping between outdoor units

■ If  $\geq 2$  m

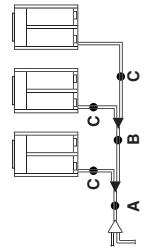


- 1 To indoor unit
- 2 Piping between outdoor units

### 6.3. Example of connection

Example of connection (Connection of 8 indoor units Heat pump system)		Branch with refnet joint	Branch with refnet joint and refnet header	Branch with refnet header																																	
<p>One outdoor unit installed (RX(Y)Q5~16)</p> <p>When multiple outdoor units installed (RX(Y)Q18~...)</p>	<p>• Use the outdoor unit multi connection piping kit that is sold separately as an option (BHFQ22M909+1359) for the multi installation of outdoor units. Selection method is as shown in the right table.</p> <p>• Never use the outdoor unit multi connection piping kit (BHFQ22M909+1359) that are sold separately as an option of M-type or T-joint.</p> <p>□ indoor unit ◁ refnet joint ▬ refnet header ◀ outdoor multi connection piping kit</p> <p>Install the joint part (◀ part in the figure) of the outdoor unit multi connection piping kit horizontally with attention to the installation restrictions described in "connecting the refrigerant piping". (* If the system capacity is RXYQ18 or more, re-read to the first outdoor branch as seen from the indoor unit.</p>																																				
		<p>Actual pipe length</p> <p>Equivalent length</p> <p>Total extension length</p> <p>Actual pipe length</p> <p>Difference in height</p> <p>Difference in height</p> <p>Difference in height</p> <p>Actual pipe length</p>	<p>Between outdoor and indoor units</p> <p>Between outdoor branch and outdoor unit (Only for RXYQ18 or more)</p> <p>Between outdoor and indoor units</p> <p>Between indoor and indoor units</p> <p>Between outdoor and outdoor units</p>	<p>Pipe length between outdoor(*) and indoor units ≤150 m [Example] unit 8: a+b+c+d+e+f+g+p≤150 m</p> <p>Equivalent pipe length between outdoor(*) and indoor units ≤175 m (Assume equivalent pipe length of refnet joint to be 0.5 m and of the refnet header to be 1.0 m. (for calculation purposes))</p> <p>Total piping length from outdoor unit* to all indoor units ≈300 m</p> <p>Piping length from outdoor branch to outdoor unit ≤10 m. Approximate length: max. 13 m</p> <p>Difference in height between outdoor and indoor units (H1) ≤50 m (≤40 m if outdoor unit is located in a lower position).</p> <p>Difference in height between adjacent indoor units (H2) ≤15 m</p> <p>Difference in height between outdoor unit (main) and outdoor unit (sub) (H3) ≤5 m</p> <p>Pipe length from first refrigerant branch kit (either refnet joint or refnet header) to indoor unit ≤40 m [Example] unit 8: b+c+d+e+f+g+p≤40 m</p>	<p>Pipe length between outdoor(*) and indoor units ≤150 m [Example] unit 8: a+i+k≤150 m</p> <p>Equivalent pipe length between outdoor(*) and indoor units ≤175 m (Assume equivalent pipe length of refnet joint to be 0.5 m and of the refnet header to be 1.0 m. (for calculation purposes))</p> <p>Total piping length from outdoor unit* to all indoor units ≈300 m</p> <p>Piping length from outdoor branch to outdoor unit ≤10 m. Approximate length: max. 13 m</p> <p>Difference in height between outdoor and indoor units (H1) ≤50 m (≤40 m if outdoor unit is located in a lower position).</p> <p>Difference in height between adjacent indoor units (H2) ≤15 m</p> <p>Difference in height between outdoor unit (main) and outdoor unit (sub) (H3) ≤5 m</p> <p>Pipe length from first refrigerant branch kit (either refnet joint or refnet header) to indoor unit ≤40 m [Example] unit 8: i+k≤40 m</p>																																
<p><b>Maximum allowable length</b></p>	<p>Between outdoor and indoor units</p>	<p>Between outdoor and indoor units</p>	<p>Between outdoor and indoor units</p>	<p>Between outdoor and indoor units</p>																																	
<p><b>Allowable height</b></p>	<p>Between outdoor and indoor units</p>	<p>Between outdoor and indoor units</p>	<p>Between outdoor and indoor units</p>	<p>Between outdoor and indoor units</p>																																	
<p><b>Allowable length after the branch</b></p>	<p>Between outdoor and indoor units</p>	<p>Between outdoor and indoor units</p>	<p>Between outdoor and indoor units</p>	<p>Between outdoor and indoor units</p>																																	
<p><b>Refrigerant branch kit selection</b></p> <p>Refrigerant branch kits can only be used with R-410A.</p>	<p><b>Outdoor unit capacity type</b></p> <table border="1"> <thead> <tr> <th>Outdoor unit capacity type</th> <th>Refrigerant branch kit name</th> </tr> </thead> <tbody> <tr> <td>RXYQ5</td> <td>KHRQ22M2017</td> </tr> <tr> <td>RXYQ8+10</td> <td>KHRQ22M2917</td> </tr> <tr> <td>RXYQ12-22</td> <td>KHRQ22M6417</td> </tr> <tr> <td>RXYQ24</td> <td>KHRQ22M7517</td> </tr> </tbody> </table> <p>• For refnet joints other than the first branch, select the proper branch kit model based on the total capacity index.</p> <p><b>Indoor capacity type</b></p> <table border="1"> <thead> <tr> <th>Indoor capacity type</th> <th>Refrigerant branch kit name</th> </tr> </thead> <tbody> <tr> <td>&lt;200</td> <td>KHRQ22M2017</td> </tr> <tr> <td>200~&lt;290</td> <td>KHRQ22M2917</td> </tr> <tr> <td>290~&lt;640</td> <td>KHRQ22M6417</td> </tr> <tr> <td>&gt;640</td> <td>KHRQ22M7517</td> </tr> </tbody> </table>	Outdoor unit capacity type	Refrigerant branch kit name	RXYQ5	KHRQ22M2017	RXYQ8+10	KHRQ22M2917	RXYQ12-22	KHRQ22M6417	RXYQ24	KHRQ22M7517	Indoor capacity type	Refrigerant branch kit name	<200	KHRQ22M2017	200~<290	KHRQ22M2917	290~<640	KHRQ22M6417	>640	KHRQ22M7517	<p><b>Indoor capacity type</b></p> <table border="1"> <thead> <tr> <th>Indoor capacity type</th> <th>Refrigerant branch kit name</th> </tr> </thead> <tbody> <tr> <td>&lt;290</td> <td>KHRQ22M29H7 (Max. 8 kit)</td> </tr> <tr> <td>290~&lt;640</td> <td>KHRQ22M64H7 (Max. 8 kit)</td> </tr> <tr> <td>&gt;640</td> <td>KHRQ22M75H7 (Max. 8 kit)</td> </tr> </tbody> </table> <p><b>How to select the refnet joint</b></p> <ul style="list-style-type: none"> <li>When using refnet joints at the first branch counted from the outdoor unit side. Choose from the following table in accordance with the capacity of the outdoor unit.</li> </ul> <p><b>How to select the refnet header</b></p> <ul style="list-style-type: none"> <li>Choose from the following table in accordance with the total capacity of all the indoor units connected below the refnet header.</li> <li>Note: 250 type cannot be connected below the refnet header.</li> </ul> <p><b>Number of outdoor units</b></p> <table border="1"> <thead> <tr> <th>Number of outdoor units</th> <th>Branch kit name</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>BHFQ22M909 (Max. 4 kit)</td> </tr> <tr> <td>3</td> <td>BHFQ22M1359 (Max. 8 kit)</td> </tr> </tbody> </table>	Indoor capacity type	Refrigerant branch kit name	<290	KHRQ22M29H7 (Max. 8 kit)	290~<640	KHRQ22M64H7 (Max. 8 kit)	>640	KHRQ22M75H7 (Max. 8 kit)	Number of outdoor units	Branch kit name	2	BHFQ22M909 (Max. 4 kit)	3	BHFQ22M1359 (Max. 8 kit)	<p><b>How to choose an outdoor branch kit (needed if the outdoor unit capacity type is RXYQ18 or more.)</b></p> <ul style="list-style-type: none"> <li>Choose from the following table in accordance with the number of outdoor units.</li> </ul>
Outdoor unit capacity type	Refrigerant branch kit name																																				
RXYQ5	KHRQ22M2017																																				
RXYQ8+10	KHRQ22M2917																																				
RXYQ12-22	KHRQ22M6417																																				
RXYQ24	KHRQ22M7517																																				
Indoor capacity type	Refrigerant branch kit name																																				
<200	KHRQ22M2017																																				
200~<290	KHRQ22M2917																																				
290~<640	KHRQ22M6417																																				
>640	KHRQ22M7517																																				
Indoor capacity type	Refrigerant branch kit name																																				
<290	KHRQ22M29H7 (Max. 8 kit)																																				
290~<640	KHRQ22M64H7 (Max. 8 kit)																																				
>640	KHRQ22M75H7 (Max. 8 kit)																																				
Number of outdoor units	Branch kit name																																				
2	BHFQ22M909 (Max. 4 kit)																																				
3	BHFQ22M1359 (Max. 8 kit)																																				
<p>Example of downstream indoor units</p>	<p>[Example] in case of refnet joint C: indoor units 3+4+5+6+7+8</p>	<p>[Example] in case of refnet joint B: indoor units 7+8, in case of refnet header: indoor units 1+2+3+4+5+6</p>	<p>[Example] in case of refnet header: indoor units 1+2+3+4+5+6+7+8</p>	<p>[Example] in case of refnet header: indoor units 1+2+3+4+5+6+7+8</p>																																	



<p><b>Pipe size selection</b> For an outdoor unit multi installation (RXYQ18-48M9W1B), make the settings in accordance with the following figure.</p> 	<p><b>A. Piping between outdoor unit and refrigerant branch kit</b></p> <ul style="list-style-type: none"> <li>Match to the size of the connection piping on the outdoor unit.</li> </ul> <p><b>Outdoor unit connection piping size</b></p> <table border="1"> <thead> <tr> <th>Outdoor unit capacity type</th> <th>Gas pipe</th> <th>Piping size (outer diameter)</th> <th>Liquid pipe</th> </tr> </thead> <tbody> <tr> <td>RXYQ5</td> <td>Ø15.9</td> <td></td> <td></td> </tr> <tr> <td>RXYQ8</td> <td>Ø19.1</td> <td></td> <td>Ø9.5</td> </tr> <tr> <td>RXYQ10</td> <td>Ø22.2</td> <td></td> <td>Ø12.7</td> </tr> <tr> <td>RXYQ12-16</td> <td>Ø28.6</td> <td></td> <td>Ø15.9</td> </tr> <tr> <td>RXYQ18-22</td> <td></td> <td>Ø34.9</td> <td>Ø19.1</td> </tr> <tr> <td>RXYQ24</td> <td></td> <td>Ø41.3</td> <td></td> </tr> <tr> <td>RXYQ26-34</td> <td></td> <td></td> <td>Ø19.1</td> </tr> <tr> <td>RXYQ36-48</td> <td></td> <td></td> <td>Ø19.1</td> </tr> </tbody> </table>	Outdoor unit capacity type	Gas pipe	Piping size (outer diameter)	Liquid pipe	RXYQ5	Ø15.9			RXYQ8	Ø19.1		Ø9.5	RXYQ10	Ø22.2		Ø12.7	RXYQ12-16	Ø28.6		Ø15.9	RXYQ18-22		Ø34.9	Ø19.1	RXYQ24		Ø41.3		RXYQ26-34			Ø19.1	RXYQ36-48			Ø19.1	<p><b>Piping between refrigerant branch kits</b></p> <ul style="list-style-type: none"> <li>Choose from the following table in accordance with the total capacity of all the indoor units connected below this.</li> <li>Do not let the connection piping exceed the refrigerant piping size chosen by general system model name.</li> </ul> <table border="1"> <thead> <tr> <th>Indoor capacity index</th> <th>Gas pipe</th> <th>Piping size (outer diameter)</th> <th>Liquid pipe</th> </tr> </thead> <tbody> <tr> <td>&lt;200</td> <td>Ø15.9</td> <td></td> <td>Ø9.5</td> </tr> <tr> <td>200&lt;x&lt;290</td> <td>Ø22.2</td> <td></td> <td>Ø12.7</td> </tr> <tr> <td>290&lt;x&lt;420</td> <td>Ø28.6</td> <td></td> <td>Ø15.9</td> </tr> <tr> <td>420&lt;x&lt;640</td> <td>Ø34.9</td> <td></td> <td>Ø19.1</td> </tr> <tr> <td>640&lt;x&lt;920</td> <td>Ø41.3</td> <td></td> <td></td> </tr> <tr> <td>&gt;920</td> <td></td> <td></td> <td>Ø19.1</td> </tr> </tbody> </table> <p><b>B. Piping between outdoor branches</b></p> <ul style="list-style-type: none"> <li>Choose from the following table in accordance with the total capacity of all the outdoor units connected above this.</li> </ul> <table border="1"> <thead> <tr> <th>Outdoor capacity index</th> <th>Gas pipe</th> <th>Piping size (outer diameter)</th> <th>Liquid pipe</th> </tr> </thead> <tbody> <tr> <td>&lt;22 HP</td> <td>Ø28.6</td> <td></td> <td>Ø15.9</td> </tr> <tr> <td>24 HP</td> <td>Ø34.9</td> <td></td> <td>Ø19.1</td> </tr> <tr> <td>&gt;26 HP</td> <td></td> <td></td> <td>Ø19.1</td> </tr> </tbody> </table>	Indoor capacity index	Gas pipe	Piping size (outer diameter)	Liquid pipe	<200	Ø15.9		Ø9.5	200<x<290	Ø22.2		Ø12.7	290<x<420	Ø28.6		Ø15.9	420<x<640	Ø34.9		Ø19.1	640<x<920	Ø41.3			>920			Ø19.1	Outdoor capacity index	Gas pipe	Piping size (outer diameter)	Liquid pipe	<22 HP	Ø28.6		Ø15.9	24 HP	Ø34.9		Ø19.1	>26 HP			Ø19.1	<p><b>Piping between refrigerant branch kit and indoor unit</b></p> <ul style="list-style-type: none"> <li>Pipe size for direct connection to indoor unit must be the same as the connection size of indoor unit.</li> </ul> <table border="1"> <thead> <tr> <th>Indoor capacity type</th> <th>Gas pipe</th> <th>Piping size (outer diameter)</th> <th>Liquid pipe</th> </tr> </thead> <tbody> <tr> <td>20-50</td> <td>Ø12.7</td> <td></td> <td>Ø6.4</td> </tr> <tr> <td>63-125</td> <td>Ø15.9</td> <td></td> <td>Ø9.5</td> </tr> <tr> <td>200</td> <td>Ø19.1</td> <td></td> <td>Ø12.7</td> </tr> <tr> <td>250</td> <td>Ø22.2</td> <td></td> <td>Ø15.9</td> </tr> </tbody> </table> <p><b>C. Piping between outdoor branch and outdoor unit</b></p> <table border="1"> <thead> <tr> <th>Outdoor capacity type</th> <th>Gas pipe</th> <th>Piping size (outer diameter)</th> <th>Liquid pipe</th> </tr> </thead> <tbody> <tr> <td>RX(Y)Q8</td> <td>Ø19.1</td> <td></td> <td>Ø9.5</td> </tr> <tr> <td>RX(Y)Q10</td> <td>Ø22.2</td> <td></td> <td>Ø12.7</td> </tr> <tr> <td>RXYQ12-16</td> <td>Ø28.6</td> <td></td> <td>Ø15.9</td> </tr> </tbody> </table>	Indoor capacity type	Gas pipe	Piping size (outer diameter)	Liquid pipe	20-50	Ø12.7		Ø6.4	63-125	Ø15.9		Ø9.5	200	Ø19.1		Ø12.7	250	Ø22.2		Ø15.9	Outdoor capacity type	Gas pipe	Piping size (outer diameter)	Liquid pipe	RX(Y)Q8	Ø19.1		Ø9.5	RX(Y)Q10	Ø22.2		Ø12.7	RXYQ12-16	Ø28.6		Ø15.9
Outdoor unit capacity type	Gas pipe	Piping size (outer diameter)	Liquid pipe																																																																																																																				
RXYQ5	Ø15.9																																																																																																																						
RXYQ8	Ø19.1		Ø9.5																																																																																																																				
RXYQ10	Ø22.2		Ø12.7																																																																																																																				
RXYQ12-16	Ø28.6		Ø15.9																																																																																																																				
RXYQ18-22		Ø34.9	Ø19.1																																																																																																																				
RXYQ24		Ø41.3																																																																																																																					
RXYQ26-34			Ø19.1																																																																																																																				
RXYQ36-48			Ø19.1																																																																																																																				
Indoor capacity index	Gas pipe	Piping size (outer diameter)	Liquid pipe																																																																																																																				
<200	Ø15.9		Ø9.5																																																																																																																				
200<x<290	Ø22.2		Ø12.7																																																																																																																				
290<x<420	Ø28.6		Ø15.9																																																																																																																				
420<x<640	Ø34.9		Ø19.1																																																																																																																				
640<x<920	Ø41.3																																																																																																																						
>920			Ø19.1																																																																																																																				
Outdoor capacity index	Gas pipe	Piping size (outer diameter)	Liquid pipe																																																																																																																				
<22 HP	Ø28.6		Ø15.9																																																																																																																				
24 HP	Ø34.9		Ø19.1																																																																																																																				
>26 HP			Ø19.1																																																																																																																				
Indoor capacity type	Gas pipe	Piping size (outer diameter)	Liquid pipe																																																																																																																				
20-50	Ø12.7		Ø6.4																																																																																																																				
63-125	Ø15.9		Ø9.5																																																																																																																				
200	Ø19.1		Ø12.7																																																																																																																				
250	Ø22.2		Ø15.9																																																																																																																				
Outdoor capacity type	Gas pipe	Piping size (outer diameter)	Liquid pipe																																																																																																																				
RX(Y)Q8	Ø19.1		Ø9.5																																																																																																																				
RX(Y)Q10	Ø22.2		Ø12.7																																																																																																																				
RXYQ12-16	Ø28.6		Ø15.9																																																																																																																				
<p><b>How to calculate the additional refrigerant to be charged</b> Additional refrigerant to be charged R (kg) R should be rounded off in units of 0.1 kg</p> <p><b>NOTE</b> If a negative result is gotten for R from the formula at right, no refrigerant needs to be added nor removed.</p>	$R = \left( \begin{array}{l} \text{Total length (m) of liquid} \\ \text{piping size at } \varnothing 22.2 \end{array} \right) \times 0.35 + \left( \begin{array}{l} \text{Total length (m) of liquid} \\ \text{piping size at } \varnothing 19.1 \end{array} \right) \times 0.25 + \left( \begin{array}{l} \text{Total length (m) of liquid} \\ \text{piping size at } \varnothing 15.9 \end{array} \right) \times 0.17 + \left( \begin{array}{l} \text{Total length (m) of liquid} \\ \text{piping size at } \varnothing 12.7 \end{array} \right) \times 0.11$ $+ \left( \begin{array}{l} \text{Total length (m) of liquid} \\ \text{piping size at } \varnothing 9.5 \end{array} \right) \times 0.054 + \left( \begin{array}{l} \text{Total length (m) of liquid} \\ \text{piping size at } \varnothing 6.4 \end{array} \right) \times 0.022$	<p><b>Example for refrigerant branch using refnet joint and refnet header for RXYQ34M9W1B</b> If the outdoor unit is RXYQ34M9W1B and the piping lengths are as below</p> <table border="1"> <tbody> <tr> <td>a: Ø19.1x30 m</td> <td>d: Ø9.5x10 m</td> <td>g: Ø6.4x10 m</td> <td>j: Ø6.4x10 m</td> </tr> <tr> <td>b: Ø15.9x10 m</td> <td>e: Ø9.5x10 m</td> <td>h: Ø6.4x20 m</td> <td>k: Ø6.4x9 m</td> </tr> <tr> <td>c: Ø9.5x10 m</td> <td>f: Ø9.5x10 m</td> <td>i: Ø12.7x10 m</td> <td></td> </tr> </tbody> </table> $R = [30 \times 0.25] + [10 \times 0.17] + [10 \times 0.11] + [40 \times 0.054] + [49 \times 0.022] + 0 = 13.538 \Rightarrow R = 13.5 \text{ kg}$ <table border="1"> <thead> <tr> <th>Model</th> <th>Amount of refrigerant</th> </tr> </thead> <tbody> <tr> <td>RXYQ8-32</td> <td>1 kg</td> </tr> <tr> <td>RXYQ5, 34-48</td> <td>0 kg</td> </tr> </tbody> </table>	a: Ø19.1x30 m	d: Ø9.5x10 m	g: Ø6.4x10 m	j: Ø6.4x10 m	b: Ø15.9x10 m	e: Ø9.5x10 m	h: Ø6.4x20 m	k: Ø6.4x9 m	c: Ø9.5x10 m	f: Ø9.5x10 m	i: Ø12.7x10 m		Model	Amount of refrigerant	RXYQ8-32	1 kg	RXYQ5, 34-48	0 kg																																																																																																			
a: Ø19.1x30 m	d: Ø9.5x10 m	g: Ø6.4x10 m	j: Ø6.4x10 m																																																																																																																				
b: Ø15.9x10 m	e: Ø9.5x10 m	h: Ø6.4x20 m	k: Ø6.4x9 m																																																																																																																				
c: Ø9.5x10 m	f: Ø9.5x10 m	i: Ø12.7x10 m																																																																																																																					
Model	Amount of refrigerant																																																																																																																						
RXYQ8-32	1 kg																																																																																																																						
RXYQ5, 34-48	0 kg																																																																																																																						

## 6.4. Leak test and vacuum drying

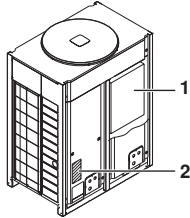
The units were checked for leaks by the manufacturer.

See [figure 9](#) and refer to "Additional refrigerant charge" on [page 11](#) for nomenclature of the parts in [figure 9](#).

- Confirm that the gas and liquid line stop valves are firmly closed before pressure test or vacuuming. Refer to "Stop valve operation procedure" on [page 10](#).
- Make sure that valve A is completely open.

Air tight test and vacuum drying

- Air tight test: Make sure to use nitrogen gas. (For the service port location, refer to the "Caution" label attached on the front panel of the outdoor unit.)



- 1 Electric box lid
- 2 Caution label location

Pressurize the liquid and gas pipes to 4.0 MPa (40 bar) (do not pressurize more than 4.0 MPa (40 bar)). If the pressure does not drop within 24 hours, the system passes the test. If the pressure drops, check where the nitrogen leaks from.

- Vacuum drying: Use a vacuum pump which can evacuate to  $-100.7$  kPa (5 Torr,  $-755$  mm Hg)
  1. Evacuate the system from the liquid and gas pipes by using a vacuum pump for more than 2 hours and bring the system to  $-100.7$  kPa. After keeping the system under that condition for more than 1 hour, check if the vacuum gauge rises or not. If it rises, the system may either contain moisture inside or have leaks.
  2. Following should be executed if there is a possibility of moisture remaining inside the pipe (if piping work is carried out during the raining season or over a long period of time, rainwater may enter the pipe during work).

After evacuating the system for 2 hours, pressurize the system to 0.05 MPa (vacuum break) with nitrogen gas and evacuate the system again using the vacuum pump for 1 hour to  $-100.7$  kPa (vacuum drying). If the system cannot be evacuated to  $-100.7$  kPa within 2 hours, repeat the operation of vacuum break and vacuum drying.

Then, after leaving the system in vacuum for 1 hour, confirm that the vacuum gauge does not rise.

**NOTE** Make sure to perform airtightness test and vacuum drying using the service ports of the stop valve shown in the table below.

RX(Y)Q5~16 RX(Y)Q18~48	Liquid line stop valve Gas line stop valve
---------------------------	---

## 6.5. Pipe insulation

After finishing the leak test and vacuum drying, the piping must be insulated. Take into account the following points:

- Make sure to insulate the connection piping and refrigerant branch kits entirely.
- Be sure to insulate liquid and gas piping (for all units).
- Use heat resistant polyethylene foam which can withstand a temperature of 70°C for liquid side piping and polyethylene foam which can withstand a temperature of 120°C for gas side piping.
- If you think the temperature and the relative humidity around the cooling pipes might exceed 30°C and RH 80%, reinforce the insulation of the cooling pipes (at least 20 mm thick). Condensation might be formed on the surface of the insulation.
- If there is a possibility that condensation on the stop valve might drip down into the indoor unit through gaps in the insulation and piping because the outdoor unit is located higher than the indoor unit this must be prevented by sealing up the connections. See [figure 8](#).

- A One outdoor unit installed
  - B When multiple outdoor units installed
- 1 Liquid line stop valve
  - 2 Gas line stop valve
  - 3 Indoor -outdoor interconnection piping
  - 4 Sealing up treatment
  - 5 Heat insulator

- For cooling only units, insulation which can withstand 70°C is also sufficient for gas side piping.



Be sure to insulate local pipes, as touching them can cause burns.

## 6.6. Checking of unit and installation conditions

Be sure to check the following:

- 1 Make sure there is no faulty power wiring or loose nuts. See "7. Field wiring" on [page 12](#).
- 2 Make sure there is no faulty transmission wiring or loose nuts. See "7. Field wiring" on [page 12](#).
- 3 Make sure there is no faulty refrigerant piping. See "6. Refrigerant piping" on [page 4](#).
- 4 Make sure piping size is correct. See "6.1. Selection of piping material" on [page 4](#).
- 5 Make sure insulation work is done. See "6.5. Pipe insulation" on [page 10](#).
- 6 Make sure the insulation resistance of the main power circuit is not deteriorated.

Using a megatester for 500 V, check that the insulation resistance of 2 MΩ or more is attained by applying a voltage of 500 V DC between the power terminals and earth. Never use the megatester for the transmission wiring (between outdoor and indoor unit, outdoor and COOL/HEAT selector, etc.).

## 6.7. Stop valve operation procedure



Do not open the stop valve until steps 1~6 of "6.6. Checking of unit and installation conditions" on [page 10](#) are completed. If the stop valve is left open without turning on the power, it may cause refrigerant to build up in the compressor, leading to insulation degradation.

Introduction

Confirm the sizes of the stop valves connected to the system referring to the table below.

	RX(Y)Q5	RX(Y)Q8	RX(Y)Q10	RXYQ12	RXYQ14	RXYQ16
Liquid line stop valve	Ø9.5		Ø12.7			
Gas line stop valve	Ø15.9	Ø22.2 <sup>(*)</sup>		Ø25.4 <sup>(†)</sup>		

(\*) The model RX(Y)Q8 supports on-site piping of Ø19.1 by the accessory pipes.

(†) The model RXYQ12~16 supports on-site piping of Ø28.6 by the accessory pipes.

## Opening stop valve

1. Remove the cap and turn the valve counterclockwise with the hexagon wrench.
2. Turn it until the shaft stops.  
Do not apply excessive force to the stop valve. Doing so may break the valve body, as the valve is not a backseat type. Always use the special tool.
3. Make sure to tighten the cap securely.

## Closing stop valve

1. Remove the cap and turn the valve clockwise with the hexagon wrench.
2. Securely tighten the valve until the shaft contacts the main body seal.
3. Make sure to tighten the cap securely.  
For the tightening torque, refer to the table below.

Tightening torque N·m (Turn clockwise to close)						
stop valve size	Shaft (valve body)		Cap (valve lid)	Service port	Flare nut	Gas line piping attached to unit
Ø9.5	5.4~6.6	Hexagonal wrench 4 mm	13.5~16.5	11.5~13.9	33~39	—
Ø12.7	8.1~9.9		18~22		50~60	
Ø15.9	13.5~16.5	Hexagonal wrench 6 mm	23~27		62~75	
Ø22.2	27~33	Hexagonal wrench 10 mm	36~44		—	22~28
Ø25.4						

(See figure 21)

- 1 Service port
- 2 Cap
- 3 Hexagon hole
- 4 Shaft
- 5 Seal

## CAUTION

- Always use a charge hose for service port connection.
- After tightening the cap, check that no refrigerant leaks are present.

## 6.8. Additional refrigerant charge



Refrigerant cannot be charged until field wiring has been completed.

Refrigerant may only be charged after performing the leak test and the vacuum drying (see above).

When charging a system, care shall be taken that its maximum permissible charge is never exceeded, in view of the danger of liquid hammer.

Charging with an unsuitable substance may cause explosions and accidents, so always ensure that the appropriate refrigerant (R-410A) is charged.

Refrigerant containers shall be opened slowly.

Always use protective gloves and protect your eyes when charging refrigerant.

See figure 9.

- 1 Pressure reducing valve
- 2 Nitrogen
- 3 Tank
- 4 Siphon system
- 5 Measuring instrument
- 6 Vacuum pump
- 7 Valve A

- 8 Gas line stop valve
- 9 Liquid line stop valve
- 10 stop valve service port
- 11 Charge hose
- 12 Indoor unit
- 13 Outdoor unit
- 14 Dotted lines represent on site piping
- 15 To indoor unit

## To avoid compressor breakdown. Do not charge the refrigerant more than the specified amount.

- This outdoor unit is factory charged with refrigerant and depending on pipe sizes and pipe lengths some systems require additional charging of refrigerant. (Refer to "How to calculate the additional refrigerant to be charged" on page 9).
- Make sure to use installation tools you exclusively use on R-410A installations to withstand the pressure and to prevent foreign materials from mixing into the system.
- Charge the refrigerant to the liquid pipe in its liquid state. Since R-410A is a mixed refrigerant, its composition changes if charged in a state of gas and normal system operation would no longer be assured.
- Before filling, check whether the tank has a siphon attached or not.

## How to fill a tank with a siphon attached

Fill with the tank upright.  
There is a siphon tube inside, so there is no need to turn the tank upside-down.



## Other ways of filling the tank

Fill with the tank upside-down.



- Determine the weight of refrigerant to be charged additionally referring to the item "Additional refrigerant charge" in "How to calculate the additional refrigerant to be charged" on page 9 and fill in the amount in the "Additional refrigerant charge label" attached to the unit.


## Charging while the outdoor unit is at standstill

- After the vacuum drying is finished, charge the additional refrigerant in its liquid state through the liquid stop valve service port taking into account following instructions:
  - Check that gas and liquid stop valves are closed.
  - Stop the compressor and charge the specified weight of refrigerant.



If the total refrigerant cannot be charged while the outdoor unit is at standstill, it is possible to charge the refrigerant by operating the outdoor unit using the refrigerant charge function (refer to "Setting mode 2" on page 18).

## Charging while the outdoor unit is operating

- 1 Completely open the gas line stop valve.  
Valve A must be left fully closed.  
Make sure the liquid stop valve is totally shut. If it is open, the refrigerant cannot be charged.  
Charge the additional refrigerant in its liquid state through the service port of the liquid line stop valve.
- 2 While the unit is at standstill and under setting mode 2 (refer to 8.2. Checks before initial start-up, "Setting the mode" on page 17), set the required function A (additional refrigerant charging operation) to ON (ON). Then operation starts. The blinking H2P led indicates test operation and the remote controller indicates TEST (test operation) and  (external control).

- 3 When the specified amount of refrigerant is charged, push the **BS3 RETURN** button. Then operation stops.
  - The operation automatically stops within 30 minutes.
  - If the refrigerant charge cannot be finished within 30 minutes, repeat step 2.
  - If the operation stops immediately after restart, there is a possibility that the system is overcharged. The refrigerant cannot be charged more than this amount.
- 4 After the refrigerant charge hose is removed, make sure to fully open the liquid stop valve. Otherwise the piping may burst due to blocked liquid.
- 5 After the refrigerant is charged, turn on the power for the indoor units and for the outdoor unit.

## 7. FIELD WIRING



All field wiring and components must be installed by a licensed electrician and must comply with relevant local and national regulations.

The field wiring must be carried out in accordance with the wiring diagrams and the instructions given below.

Be sure to use a dedicated power circuit. Never use a power supply shared by another appliance. This can lead to electric shock or fire.

Do not operate until refrigerant piping work is completed. (If operated before completion of the piping work, the compressor may break down.)

Never remove a thermistor, sensor, etc., when connecting power wiring and transmission wiring. (If operated without thermistor, sensor, etc., the compressor may break down.)

This product's reversed phase protection detector only works when the product started up.

The reversed phase protection detector is designed to stop the product in the event of an abnormalities when the product is started up.

Replace two of the three phases (L1, L2, and L3) during reverse-phase protection circuit operation.

Reversed phase detection is not performed while the product is operating.

If there exists the possibility of reversed phase after an momentary black out and the power goes on and off while the product is operating, attach a reversed phase protection circuit locally. Running the product in reversed phase can break the compressor and other parts.

### 7.1. Internal wiring – Parts table

Refer to the wiring diagram sticker on the unit. The abbreviations used are listed below:

A1P-A6P.....	Printed circuit board
BS1-5.....	Push button switch (mode, set, return, wiring check, reset)
C63,66.....	Capacitor
DS1~3.....	Dip switch
E1HC~3HC.....	Crankcase heater
F1U.....	Fuse (250 V, 5 A, B)(A4P)
F1U,2U.....	Fuse (250 V, 10 A, B)(A1P)
F5U.....	Field fuse
H1P-8P.....	Light emitting diode (service monitor - orange)
HAP.....	Pilot lamp (service monitor - green)
K1.....	Magnetic relay

K2.....	Magnetic contactor (MIC)
K2M-3M.....	Magnetic contactor (M2C-M3C)
K1R-15R.....	Magnetic relay
L1R.....	Reactor
M1C,2C,3C.....	Motor (compressor)
M1F.....	Motor (fan)
PS.....	Switching power supply
Q1DI.....	Earth leakage breaker (field supply)
Q1RP.....	Phase reversal detect circuit
R10.....	Resistor (current sensor)
R50-59.....	Resistor
R95.....	Resistor (current limiting)
R1T.....	Thermistor (fin) (A2P)
R1T.....	Thermistor (air) (A1P)
R2T.....	Thermistor (suction)
R31T~33T.....	Thermistor (discharge)
R4T.....	Thermistor (coil-deicer)
R5T.....	Thermistor (coil-outlet)
R6T.....	Thermistor (liquid-pipe receiver)
S1NPH.....	Pressure sensor (high)
S1NPL.....	Pressure sensor (low)
S1PH,3PH.....	Pressure switch (high)
T1A.....	Current sensor (A5P,A6P)
T1R.....	Transformer
V1CP.....	Safety devices input
V1R.....	Power module (A3P)
V1R,V2R.....	Power module (A2P)
X1A,X2A.....	Connector (Y1E,Y2E)
X1M.....	Terminal strip (Power supply)
X1M.....	Terminal strip (control)(A1P)
Y1E,2E.....	Expansion valve (electronic type) (main, subcool)
Y1S.....	Solenoid valve (hotgas bypass)
Y2S.....	Solenoid valve (receiver gas purge)
Y3S.....	Solenoid valve (liquid pipe)
Y4S.....	Solenoid valve (4 way valve)
Z1C-7C.....	Noise filter (ferrite core)
Z1F.....	Noise filter (with surge absorber)

■ ■ ■ ■.....	Field wiring
L1,L2,L3.....	Live
N.....	Neutral
☐.....	Connector
○.....	Wire clamp
Ⓧ.....	Protective earth (screw)
BLK.....	Black
BLU.....	Blue
BRN.....	Brown
GRY.....	Gray
ORG.....	Orange
PNK.....	Pink
RED.....	Red
WHT.....	White
YLW.....	Yellow

## 7.2. Optional parts cool/heat selector

S1S .....Selector switch (fan, cool/heat)

S2S .....Selector switch (cool/heat)

### NOTE



- Use copper conductors only.
- When using the adaptor for sequential start, refer to "7.5. Examples" on page 14.
- For connection wiring to outdoor-outdoor transmission F1-F2, outdoor-indoor transmission F1-F2, outdoor-multi transmission Q1-Q2, refer to "7.5. Examples" on page 14.
- For connection wiring to the central remote controller, refer to the installation manual of the central remote controller.
- Use insulated wire for the power cord.

## 7.3. Power circuit and cable requirements

A power circuit (see table below) must be provided for connection of the unit. This circuit must be protected with the required safety devices, i.e. a main switch, a slow blow fuse on each phase and an earth leakage breaker.

	Phase and frequency	Voltage	Recommended fuses	Transmission line section
RX(Y)Q5	3 N~50 Hz	400 V	16 A	0.75~1.25 mm <sup>2</sup>
RX(Y)Q8	3 N~50 Hz	400 V	32 A	0.75~1.25 mm <sup>2</sup>
RX(Y)Q10	3 N~50 Hz	400 V	32 A	0.75~1.25 mm <sup>2</sup>
RXYQ12	3 N~50 Hz	400 V	32 A	0.75~1.25 mm <sup>2</sup>
RXYQ14	3 N~50 Hz	400 V	50 A	0.75~1.25 mm <sup>2</sup>
RXYQ16	3 N~50 Hz	400 V	50 A	0.75~1.25 mm <sup>2</sup>
RXYQ18	3 N~50 Hz	400 V	63 A	0.75~1.25 mm <sup>2</sup>
RXYQ20	3 N~50 Hz	400 V	63 A	0.75~1.25 mm <sup>2</sup>
RXYQ22	3 N~50 Hz	400 V	63 A	0.75~1.25 mm <sup>2</sup>
RXYQ24	3 N~50 Hz	400 V	80 A	0.75~1.25 mm <sup>2</sup>
RXYQ26	3 N~50 Hz	400 V	80 A	0.75~1.25 mm <sup>2</sup>
RXYQ28	3 N~50 Hz	400 V	80 A	0.75~1.25 mm <sup>2</sup>
RXYQ30	3 N~50 Hz	400 V	100 A	0.75~1.25 mm <sup>2</sup>
RXYQ32	3 N~50 Hz	400 V	100 A	0.75~1.25 mm <sup>2</sup>
RXYQ34	3 N~50 Hz	400 V	100 A	0.75~1.25 mm <sup>2</sup>
RXYQ36	3 N~50 Hz	400 V	100 A	0.75~1.25 mm <sup>2</sup>
RXYQ38	3 N~50 Hz	400 V	100 A	0.75~1.25 mm <sup>2</sup>
RXYQ40	3 N~50 Hz	400 V	125 A	0.75~1.25 mm <sup>2</sup>
RXYQ42	3 N~50 Hz	400 V	125 A	0.75~1.25 mm <sup>2</sup>
RXYQ44	3 N~50 Hz	400 V	125 A	0.75~1.25 mm <sup>2</sup>
RXYQ46	3 N~50 Hz	400 V	125 A	0.75~1.25 mm <sup>2</sup>
RXYQ48	3 N~50 Hz	400 V	125 A	0.75~1.25 mm <sup>2</sup>

When using residual current operated circuit breakers, be sure to use a high-speed type 300 mA rated residual operating current.

Be sure to install a main switch for the complete system.

### NOTE



- Select the power supply cable in accordance with relevant local and national regulations.
- Wire size must comply with the applicable local and national code.
- Specifications for local wiring power cord and branch wiring are in compliance with IEC60245.
- WIRE TYPE H05VV(\*)  
\*Only in protected pipes (use H07RN-F when protected pipes are not used).

## 7.4. General cautions

- Up to 3 units can be connected by crossover power source wiring between outdoor units. However, units of smaller capacity must be connected downstream. For details, refer to the equipment design data and technical data.
- When connecting several units in VRV combination, the power supply of each outdoor unit can also be connected separately. Refer to the field wiring on the engineering data book for further details.
- Make sure to connect the power source wire to the power source terminal block and to clamp it as shown in figure 10, chapter "Field line connection".
- As this unit is equipped with an inverter, installing a phase advancing capacitor not only will deteriorate power factor improvement effect, but also may cause capacitor abnormal heating accident due to high-frequency waves. Therefore, never install a phase advancing capacitor.
- Keep power imbalance within 2% of the supply rating.
  - Large imbalance will shorten the life of the smoothing capacitor.
  - As a protective measure, the product will stop operating and an error indication will be made, when power imbalance exceeds 4% of the supply rating.
- Follow the "electrical wiring diagram" when carrying out any electrical wiring.
- Only proceed with wiring work after blocking off all power.
- Always ground wires. (In accordance with national regulations of the pertinent country.)
- Do not connect the ground wire to gas pipes, sewage pipes, lightning rods, or telephone ground wires. This may cause electric shock.
  - Combustion gas pipes: can explode or catch fire if there is a gas leak.
  - Sewage pipes: no grounding effect is possible if hard plastic piping is used.
  - Telephone ground wires and lightning rods: dangerous when struck by lightning due to abnormal rise in electrical potential in the grounding.
- This unit uses an inverter, and therefore generates noise, which will have to be reduced to avoid interfering with other devices. The outer casing of the product may take on an electrical charge due to leaked electrical current, which will have to be discharged with the grounding.
- Be sure to install an earth leakage breaker. (One that can handle high-frequency electrical noise.)  
(This unit uses an inverter, which means that an earth leakage breaker capable of handling high-frequency electrical noise must be used in order to prevent malfunctioning of the earth leakage breaker itself.)
- Earth leakage breakers that are especially designed for protecting ground-faults must be used in conjunction with main switch and fuse for use with wiring.
- This unit has a negative phase protection circuit. (If it is activated, only operate the unit after correcting the wiring.)
- Power supply wires must be attached securely.
- If the power supply has a missing or wrong N-phase, equipment will break down.
- Make sure that all wiring is secure, the specified wires are used, and no external forces act on the terminal connection or wires. Improper connections or installation may result in fire.
- When wiring the power supply and connecting the remote controller wiring and transmission wiring, position the wires so that the control box lid can be securely fastened. Improper positioning of the control box lid may result in electric shocks, fire, or overheating of the terminals.



## 7.5. Examples

### System example (See figure 11)

- 1 Field power supply
- 2 Main switch
- 3 Earth leakage breaker
- 4 Fuse
- 5 Cool/heat selector
- 6 Remote controller
- Power supply wiring (sheathed cable)
- Transmission wiring (sheathed cable)


### Field line connection

L1, L2, L3, N-phase of the power cord should be clamped to the plastic bracket using field supplied clamp material.

The green and yellow striped wrapped wires should be used for grounding. (See figure 10)

- 1 Power supply (400 V, Three-phase)
- 2 Fuse
- 3 Grounding wire
- 4 Earth leakage breaker
- 5 Attach insulation sleeves
- 6 Power supply terminal block
- 7 Ground wire
- 8 Clamp the ground wires along with the power wires using field supplied clamps.
- 9 Clamp each power wire separately to the plastic brackets using field supplied clamps.
- 10 When wiring, do not allow the ground wires to contact the compressor lead wires. If the wires contact each other, adverse effects may occur to other units.
- 11 When connecting two wires to one terminal, ensure that the crimp-style terminals face with each other back to back. Moreover, make sure that the wire of the smaller gauge is located above.
- 12 Crimp-style terminal
- 13 Wire gauge: Small
- 14 Wire gauge: Large
- 15 Plastic bracket

See figure 19

- 1 Electric wiring
- 2 Wiring between units
- 3 Clamp to the electric box with field supplied clamps.
- 4 When routing out the power/ground wires from the right side:
- 5 When routing the remote control cord and inter-unit wiring, secure clearance of 50 mm or more from the power wiring. Ensure that the power wiring does not contact any heated sections (  ).
- 6 Clamp to the back of the column support with field supplied clamps.
- 7 When routing out the inter-unit wirings from the opening for piping:
- 8 When routing out the power/ground wires from the front:
- 9 When routing out the ground wires from the left side:
- 10 Grounding wire
- 11 When wiring, pay attention not to detach the acoustic insulators from the compressor.
- 12 Power supply
- 13 Fuse
- 14 Earth leakage breaker
- 15 Ground wire
- 16 Unit A
- 17 Unit B
- 18 Unit C

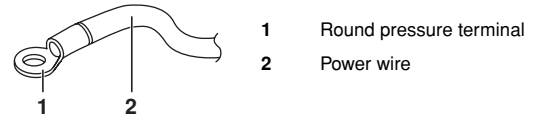


### Precautions when laying power wiring

Use round pressure terminals for connections to the power terminal block.

When none are available, follow the instructions below.

- Do not connect wiring of different thicknesses to the power terminal block. (Slack in the power wiring may cause abnormal heat.)
- When connecting wiring which is the same thickness, do as shown in the figure below.

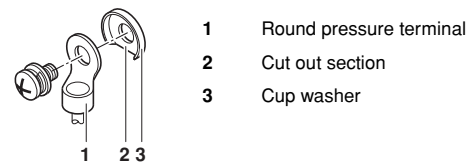


- For wiring, use the designated power wire and connect firmly, then secure to prevent outside pressure being exerted on the terminal board.
- Use an appropriate screwdriver for tightening the terminal screws. A screwdriver with a small head will strip the head and make proper tightening impossible.
- Over-tightening the terminal screws may break them.
- See the table below for tightening torque for the terminal screws.

Tightening torque (N·m)	
M8 (Power terminal block)	5.5~7.3
M8 (Ground)	
M3 (Inter-unit wiring terminal block)	0.8~0.97

### Precautions when connecting the ground

When pulling the ground wire out, wire it so that it comes through the cut out section of the cup washer. (An improper ground connection may prevent a good ground from being achieved.)



### Field line connection: transmission wiring and cool/heat selection

In case of RX(Y)Q5~16 (See figure 14)

- 1 Cool/heat selector (not required for cooling only units)
- 2 Outdoor unit PC board (A1P)
- 3 Take care of the polarity (not required for cooling only units)
- 4 Use the conductor of sheathed wire (2 wire) (no polarity)
- 5 Terminal board (field supply)
- 6 Indoor unit
- 7 Outdoor unit

## In case of RXYQ18~48 (See figure 15)

- 1 Unit A (Base unit)
- 2 Unit B
- 3 Unit C
- 4 To cooler/heater selector
- 5 To indoor unit
- 6 To outdoor unit
- 7 To multi unit

**NOTE** RXYQ5 cannot install the multi unit transmission wiring. Run will not be successful if the wiring is connected to Q1-Q2 (TO MULTI UNIT) terminal.

## Fixing field line connection (See figure 12)

- 1 Heating/cooling switching remote control cord (when a heating/cooling switch remote control (optional) is connected) (not for RXQ5~10)
- 2 Fix to the indicated plastic brackets using field supplied clamping material.
- 3 Wiring between the units (Outdoor - outdoor)
- 4 Wiring between the units (Indoor - outdoor)
- 5 Wiring for multi connection (only for RXYQ18~48)
- 6 Plastic bracket



- Be sure to follow the limits below. If the unit-to-unit cables are beyond these limits, it may result in malfunction of transmission.  
Maximum wiring length: 1000 m  
Total wiring length: 2000 m  
Maximum No. of branches: 16
  - Maximum number of outdoor units connectable: 10.
  - Up to 16 branches are possible for unit-to-unit cabling. No branching is allowed after branching. (See figure 13)
- 1 Branch
  - 2 Subbranching
- Never connect the power supply to unit-to-unit cabling terminal block. Otherwise the entire system may break down.

## Sequential start

Make the outdoor unit cable connections shown below.

The outdoor unit PC board (A1P) is factory set at "Sequential start available".

## Setting the cool/heat operation (heat pump unit only)

- 1 Performing cool/heat setting with the remote controller connected to the indoor unit.  
Keep the cool/heat selector switch (DS1) on the outdoor unit PC board at the factory setting position IN/D UNIT. (See figure 16)
  - 1 Remote controller
- 2 Performing cool/heat setting with the cool/heat selector.  
Connect the cool/heat selector remote controller (optional) to the A/B/C terminals and set the cool/heat selector switch (DS1) on the outdoor unit PC board (A1P) to OUT/D UNIT. (See figure 17)
  - 1 Cool/heat selector



For low-noise operation, it is necessary to get the optional 'External control adaptor for outdoor unit' (DTA104A61/62).

For details, see the installation manual attached to the adaptor.

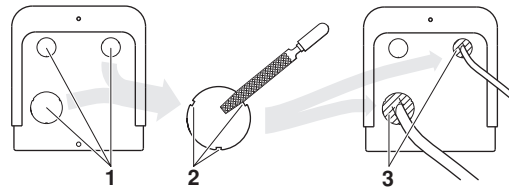
## Picking power line and transmission line

- Be sure to let the power line and the transmission line pass through a conduit hole.
- Pick the power line from the upper hole on the left side plate, from the front position of the main unit (through the conduit hole of the wiring mounting plate) or from a knock out hole to be made in the unit's bottom plate. (See figure 18)

- A Electric wiring diagram. Printed on the back of the electric box lid.
- 1 Cut off the shaded zones before use.
- 2 Through cover
- 3 Power wiring between outdoor units (When the wiring is routed out through the lateral panel.)
- 4 Set apart
- 5 Transmission wire
- 6 Knockout hole
- 7 Power wiring between outdoor units (when wiring is routed through the front panel)

## Precautions when knocking out knockout holes

- To punch a knockout hole, hit on it with a hammer.
- After knocking out the holes, we recommend you paint the edges and areas around the edges using the repair paint to prevent rusting.
- When passing electrical wiring through the knockout holes, remove any burrs from the knockout holes and wrap the wiring with protective tape to prevent damage.



- 1 Knockout hole
- 2 Burr
- 3 If there are any possibilities that small animals enter the system through the knockout holes, plug the holes with packing materials (to be prepared on-site).



- Use a power wire pipe for the power wiring.
- Outside the unit, make sure the weak low voltage electric wiring (i.e. for the remote control, between units, etc.) and the high voltage electric wiring do not pass near each other, keeping them at least 50 mm apart. Proximity may cause electrical interference, malfunctions, and breakage.
- Be sure to connect the power wiring to the power wiring terminal block and secure it as described under "Field line connection" on page 14.
- Inter-unit wiring should be secured as described in "Field line connection" in chapter "7.5. Examples" on page 14.
  - Secure the wiring with the accessory clamps so that it does not touch the piping.
  - Make sure the wiring and the electric box lid do not stick up above the structure, and close the cover firmly.

Never connect 400 V to the terminal block of the interconnecting wiring. Doing so will break the entire system.

- The wiring from the indoor units must be connected to the F1/F2 (In-Out) terminals on the PC board in the outdoor unit.
- After installing the interconnecting wires inside the unit, wrap them along with the on-site refrigerant pipes using finishing tape, as shown in [figure 22](#).

- |   |                        |
|---|------------------------|
| 1 | Liquid pipe            |
| 2 | Gas pipe               |
| 3 | Interconnecting wiring |
| 4 | Insulator              |
| 5 | Finishing tape         |

For the above wiring, always use vinyl cords with 0.75 to 1.25 mm<sup>2</sup> sheath or cables (2-core wires). (3-core wire cables are allowable for the cooler/heater changeover remote controller only.)

#### In case of RXYQ18~48

- The interconnecting wiring between the outdoor units in the same pipe line must be connected to the Q1/Q2 (Out Multi) terminals. Connecting the wires to the F1/F2 (Out-Out) terminals results in system malfunction.
- The wiring for the other lines must be connected to the F1/F2 (Out-Out) terminals of the P-board in the outdoor unit to which the interconnecting wiring for the indoor units is connected.
- The base unit is the outdoor unit to which the interconnecting wiring for the indoor units is connected.
- The interconnecting wiring between the outdoor units must be ≤30 m.  
See the paragraph "[Fixing field line connection](#)" on page 15.



- Be sure to keep the power line and transmission line apart from each other.
- Be careful about polarity of the transmission line.
- Make sure that the transmission line is clamped as shown in the figure in "[Field line connection](#)" in chapter "7.5. Examples" on page 14.
- Check that wiring lines do not make contact with refrigerant piping.
- Firmly close the lid and arrange the electrical wires so as to prevent the lid or other parts from coming loose.
- When you do not use a wire conduit, be sure to protect the wires with vinyl tubes etc, to prevent the edge of the knock-out hole from cutting the wires.

## 8. BEFORE OPERATION

### 8.1. Service precautions

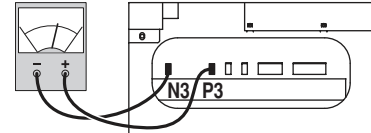


**WARNING: ELECTRIC SHOCK**



#### Caution when performing service to inverter equipment

- Do not touch live parts for 10 minutes after the power supply is turned off because of high voltage risk.
- Additionally, measure the points as shown in the figure with a tester and confirm that the voltage of the capacitor in the main circuit is not higher than 50 V DC.



Then pull out the connector (N3, P3). Please pay attention not to come in contact with live parts.

- After the service is finished, re-connect the connector (N3, P3). Otherwise malfunction may occur.

#### Caution when obtaining access to terminals

- Before obtaining access to terminals in the switch box, all supply circuits must be disconnected.
- Be careful when taking off the cover. Touching live parts may cause electric shock.
- After servicing is finished, re-attach the cover. Otherwise malfunction may occur due to intrusion of water or other foreign materials.

#### NOTE



#### Play it safe!

For protection of the PCB, touch the switch box casing by hand in order to eliminate static electricity from your body before performing service.

### 8.2. Checks before initial start-up



- Make sure that the circuit breaker on the power supply panel of the installation is switched off.
- Attach the power wire securely.
- Introducing power with a missing N-phase or with a mistaken N-phase will break the equipment.

After the installation, check the following before switching on the circuit breaker:

- 1 The position of the switches that require an initial setting  
Make sure that switches are set according to your application needs before turning the power supply on.
- 2 Power supply wiring and transmission wiring  
Use a designated power supply and transmission wiring and make sure that it has been carried out according to the instructions described in this manual, according to the wiring diagrams and according to local and national regulations.
- 3 Pipe sizes and pipe insulation  
Make sure that correct pipe sizes are installed and that the insulation work is properly executed.

#### 4 Additional refrigerant charge

The amount of refrigerant to be added to the unit should be written on the included "Added Refrigerant" plate and attached to the rear side of the front cover.

#### 5 Insulation test of the main power circuit

Using a megatester for 500 V, check that the insulation resistance of 2 MΩ or more is attained by applying a voltage of 500 V DC between power terminals and earth. Never use the megatester for the transmission wiring.

#### 6 Installation date

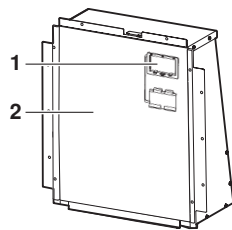
Be sure to keep record of the installation date on the sticker on the rear of the upper front panel according to EN60335-2-40.

### 8.3. Field setting

If required, carry out field settings according to the following instructions. Refer to the service manual for more details.

#### Opening the switch box and handling the switches

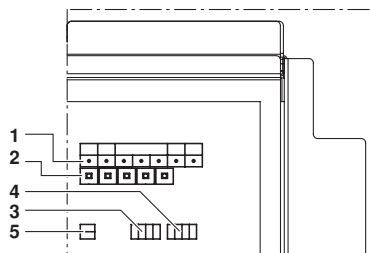
When carrying out field settings, remove the inspection cover (1). Operate the switches with an insulated stick (such as a ball-point pen) to avoid touching live parts.



Make sure to re-attach the inspection cover (1) into the switch box cover (2) after the job is finished.

#### Location of the dip switches, leds and buttons

- 1 Led H1~7P
- 2 Push button switches BS1~BS5
- 3 Dip switch 1 (DS1: 1~4)
- 4 Dip switch 2 (DS2: 1~4)
- 5 Dip switch 3 (DS3: 1~2)



#### Led state

Throughout the manual the state of the leds is indicated as follows:

- OFF
- ON
- ◐ blinking

#### Setting the dip switches (only in case of a heat pump unit)

What to set with dip switch DS1	
1	COOL/HEAT selector (refer to "Field line connection: transmission wiring and cool/heat selection" on page 14) (OFF = not installed = factory setting)
2-4	NOT USED DO NOT CHANGE THE FACTORY SETTING.
What to set with dip switch DS2	
1-4	NOT USED DO NOT CHANGE THE FACTORY SETTING.
What to set with dip switch DS3	
1+2	NOT USED DO NOT CHANGE THE FACTORY SETTING.

### Setting the push button switch (BS1~5)

Function of the push button switch which is located on the outdoor unit PCB (A1P):

MODE	TEST: ◐	C/H SELECT			L.N.O.P	DEMAND
	HWL: ○	IND	MASTER	SLAVE		
● H1P	● H2P	○ H3P	● H4P	● H5P	● H6P	● H7P



- BS1 MODE** For changing the set mode
- BS2 SET** For field setting
- BS3 RETURN** For field setting
- BS4 TEST** For test operation
- BS5 RESET** For resetting the address when the wiring is changed or when an additional indoor unit is installed

The figure shows state of the led indications when the unit is shipped from the factory.

#### Setting the mode

The set mode can be changed with the **BS1 MODE** button according to the following procedure:

- **For setting mode 1:** Press the **BS1 MODE** button once, the H1P led is off ●.
- **For setting mode 2:** Press the **BS1 MODE** button for 5 seconds, the H1P led is on ○.

If the H1P led is blinking ◐ and the **BS1 MODE** button is pushed once, the setting mode will change to setting mode 1.

**NOTE** If you get confused in the middle of the setting process, push the **BS1 MODE** button. Then it returns to setting mode 1 (H1P led is off).

#### Setting mode 1 (not in case of cooling only unit)

The H1P led is off (COOL/HEAT selection setting).

#### Setting procedure

- 1 Push the **BS2 SET** button and adjust the led indication to either one of the possible settings as shown below in the field marked :
  - 1 In case of COOL/HEAT setting by each individual outdoor unit circuit.
  - 2 In case of COOL/HEAT setting by the master unit when outdoor units are connected in multiple system-combination (\*).
  - 3 In case of COOL/HEAT setting by the slave unit when outdoor units are connected in multiple system-combination (\*).

	H1P	H2P	H3P	H4P	H5P	H6P	H7P
1	●	●	◐	●	●	●	●
2	●	●	●	◐	●	●	●
3	●	●	●	●	◐	●	●


(\* ) It is necessary to use the optional external control adapter for outdoor unit (DTA104A61/62). See the instruction delivered with the adapter.

- 2 Push the **BS3 RETURN** button and the setting is defined.

## Setting mode 2

The H1P led is on.


### Setting procedure

- 1 Push the **BS2 SET** button according to the required function (A~G). The led indication that matches the required function is shown below in the field marked :

#### Possible functions

- A additional refrigerant charging operation.
- B refrigerant recovery operation/vacuuuming operation.
- C setting of high static pressure.
- D automatic low noise operation setting at nighttime.
- E low noise operation level setting (L.N.O.P) via the external control adapter.
- F power consumption limitation setting (DEMAND) via the external control adapter.
- G enabling function of the low noise operation level setting (L.N.O.P) and/or power consumption limitation setting (DEMAND) via the external control adapter (DTA104A61/62).

	H1P	H2P	H3P	H4P	H5P	H6P	H7P
A	○	●	○	●	○	●	●
B	○	●	○	●	○	●	○
C	○	●	○	●	●	○	●
D	○	●	○	○	○	○	●
E	○	●	○	○	○	○	○
F	○	●	○	○	○	○	●
G	○	●	●	○	○	●	●

- 2 When the **BS3 RETURN** button is pushed, the current setting is defined.
- 3 Push the **BS2 SET** button according to the required setting possibility as shown below in the field marked .
- 3.1 Possible settings for function A, B, C and G are **ON** (ON) or **OFF** (OFF).

	H1P	H2P	H3P	H4P	H5P	H6P	H7P
ON	○	●	●	●	●	○	●
OFF <sup>(*)</sup>	○	●	●	●	●	●	○

(\*) This setting = factory setting

- 3.2 Possible settings for function D

The noise of level 3 < level 2 < level 1 (▲1).

	H1P	H2P	H3P	H4P	H5P	H6P	H7P
OFF <sup>(*)</sup>	○	●	●	●	●	●	●
▲1	○	●	●	●	●	●	○
▲2	○	●	●	●	●	○	●
▲3	○	●	●	●	●	○	○

(\*) This setting = factory setting

- 3.3 Possible settings for function E and F

For function E (L.N.O.P) only: the noise of level 3 < level 2 < level 1 (▲1).

For function F (DEMAND) only: the power consumption of level 1 < level 2 < level 3 (▲3).

	H1P	H2P	H3P	H4P	H5P	H6P	H7P
▲1	○	●	●	●	●	●	○
▲2 <sup>(*)</sup>	○	●	●	●	●	○	●
▲3	○	●	●	●	○	●	●


(\*) This setting = factory setting

- 4 Push the **BS3 RETURN** button and the setting is defined.
- 5 When the **BS3 RETURN** button is pushed again, the operation starts according to the setting.

Refer to the service manual for more details and for other settings.

## Confirmation of the set mode

**The following items can be confirmed by setting mode 1 (H1P led is off)**

Check the led indication in the field marked .

- 1 Indication of the present operation state
  - ● normal
  - ○ abnormal
  - ◐ under preparation or under test operation

H1P	H2P	H3P	H4P	H5P	H6P	H7P
●	●	○	●	●	●	●

- 2 Indication of COOL/HEAT selection setting

- 1 When set to COOL/HEAT change-over by each individual outdoor unit circuit (= factory setting).
- 2 Indication on master unit when COOL/HEAT change-over is carried out by outdoor system connected in multiple system-combination.
- 3 Indication on slave unit when COOL/HEAT change-over is carried out by outdoor system connected in multiple system-combination.

	H1P	H2P	H3P	H4P	H5P	H6P	H7P
1 <sup>(*)</sup>	●	●	○	●	●	●	●
2	●	●	●	○	●	●	●
3	●	●	●	●	○	●	●

(\*) This setting = factory setting.

- 3 Indication of low noise operation state L.N.O.P

- ● standard operation (= factory setting)
- ○ L.N.O.P operation

H1P	H2P	H3P	H4P	H5P	H6P	H7P
●	●	○	●	●	●	●

- 4 Indication of power consumption limitation setting DEMAND

- ● standard operation (= factory setting)
- ○ DEMAND operation

H1P	H2P	H3P	H4P	H5P	H6P	H7P
●	●	○	●	●	●	●



## 8.4. Test operation

### NOTE



- In case of 18~48 type: check the setting and the indication results. Refer to chapter "Caution for 18~48 type units" on page 19.
- After turning on the power supply, the unit cannot be started until the H2P initialisation led goes off (maximum 12 minutes).

- Check the stop valves  
Make sure to open the gas and liquid line stop valves.
- After installation, perform the test operation.  
Unless the test operation is performed, the error code "U3" is shown on the remote controller and the unit cannot be operated.

### Performing the test operation

- 1 To protect the compressor, make sure to turn on the power supply 6 hours before starting operation.
- 2 Set to setting mode 1 (H1P led is off) (refer to "Setting mode 1" on page 17).
- 3 Press the **BS4 TEST** button for 5 seconds (or longer when the unit is at standstill). The test operation starts when the H2P led blinks and the remote controller indicates **TEST** (test operation) and (external control).

It may take 10 minutes to bring the state of refrigerant uniform before the compressor starts, but that is not a malfunction. The test operation is automatically carried out in cooling mode during 15~30 minutes. Depending on the situation, the refrigerant running sound or the sound of a magnetic solenoid valve may rise during this operation.

The following items are automatically checked:

- Check for miswiring
- Check if stop valves are open
- Check of refrigerant charge
- Automatic judgement of piping length

### NOTE



When you want to terminate the test operation, press the **BS3 RETURN** button. The unit will keep running for 30 seconds and then stops. During test operation it is impossible to stop the unit with the remote controller.

- 4 After the test operation (maximum 30 minutes), the unit automatically stops. Check the operation results by the outdoor unit led indication.

	H1P	H2P	H3P	H4P	H5P	H6P	H7P
normal	●	●	○	●	●	●	●
abnormal	●	○	○	●	●	●	●



- Indoor units cannot be checked individually. After the test operation is finished, check the indoor units individually via the remote controller.
- The led indication changes during this operation, but that is not abnormal.
- Please attach the front plate of the outdoor unit in order to prevent incorrect judgement during operation.

- 5 Measure to be taken when operation finishes abnormally
  1. Confirm the error code on the remote controller.
  2. Correct what is abnormal.  
(See the installation manual and operation manual or contact your dealer.)
  3. After the error is corrected, press the **BS3 RETURN** button and reset the error code.
  4. Start the unit again to confirm that the problem is properly solved.

### Error codes on the remote controller:

Installation error	Error code	Remedial action
The stop valve of an outdoor unit is left closed.	E3 E4 F3 UF	Check referring to the table in "6.8. Additional refrigerant charge" on page 11
The phases of the power to the outdoor units are reversed.	U1	Exchange two of the three phases (L1, L2, L3) to make a positive phase connection.
No power is supplied to an outdoor or indoor unit (including phase interruption).	U1 U4	Check if the power wiring for the outdoor units are connected correctly. (If the power wire is not connected to L2 phase, no malfunction display will appear and the compressor will not work.)
Incorrect interconnections between units	UF	Check if the refrigerant line piping and the unit wiring are consistent with each other.
Refrigerant overcharge	E3 F6 UF	Recalculate the required amount of refrigerant from the piping length and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.
For the RX(Y)Q5~16, the wiring is connected to the Q1/Q2 (Out Multi)	U7 UF	Remove the wiring from the Q1/Q2 (Out Multi).
Insufficient refrigerant	E4 F3	Check if the additional refrigerant charge has been finished correctly. Recalculate the required amount of refrigerant from the piping length and add an adequate amount of refrigerant.

- 6 Caution for 18~48 type units

- Indication of the outdoor unit PCB

	H1P	H2P	H3P	H4P	H5P	H6P	H7P
Master unit	●	●	○	●	●	●	●
Slave unit 1	●	●	●	●	●	●	○
Slave unit 2	●	●	●	●	●	●	●

- The outdoor unit connected to the indoor unit by piping is the master outdoor unit. The other outdoor units (not connected to the indoor unit) are the slave outdoor units.
  - Carry out all the settings of the master unit. Settings on the slave units have no effect.
  - Carry out the leakage and vacuum tests of the oil pressure equalizer and make sure to open the stop valve of the oil equalizer.
  - If the unit is operated with the valve closed, it may not function properly or even damage the equipment.
- 7 If no error code is indicated on the remote controller, it is possible to start operation after 5 minutes.

## 8.5. Temperature adjustment operation confirmation

After the test run is over, operate the unit normally. (Heating is not possible if the outdoor temperature is 24°C or higher.)

- Make sure the indoor and outdoor units are operating normally (If a knocking sound can be heard in the liquid compression of the compressor, stop the unit immediately and then energize the heater for a sufficient length of time before restarting the operation.)
- Run each indoor unit one at a time and make sure the corresponding outdoor unit is also running.
- Check to see if cold (or hot) air is coming out of the indoor unit.
- Press the fan direction and fan strength buttons on the indoor unit to see if they operate properly.




### Cautions for normal operation check

- Once stopping, the compressor will not restart in about 5 minutes even if the Run/Stop button of an indoor unit in the same system is pressed.
- When the system operation is stopped by the remote controller, the outdoor units may continue operating for further 5 minutes at maximum.
- After the test run, when handing the unit over to the customer, make sure the electric box lid, the service lid, and the unit casing are all attached.

## 9. SERVICE MODE OPERATION


### Vacuumping method

At the first installation, this vacuuming is not required. It is required only for repair purposes.

- 1 When the unit is at standstill and under the setting mode 2, set the required function B (refrigerant recovery operation/vacuumping operation) to ON (ON).
  - After this is set, do not reset the setting mode 2 until the vacuuming is finished.
  - The H1P led is on and the remote controller indicates **TEST** (test operation) and  (external control) and the operation will be prohibited.
- 2 Evacuate the system with a vacuum pump.
- 3 Press the **BS1 MODE** button and reset the setting mode 2.

### Refrigerant recovery operation method

by a refrigerant reclaimer

- 1 When the unit is at standstill and under the setting mode 2, set the required function B (refrigerant recovery operation/vacuumping operation) to ON (ON).
  - The indoor unit and the outdoor unit expansion valves will fully open and some solenoid valves will be turned on.
  - The H1P led is on and the remote controller indicates **TEST** (test operation) and  (external control) and the operation will be prohibited.
- 2 Cut off the power supply to the indoor units and the outdoor unit with the circuit breaker. After the power supply to one side is cut off, cut off the power supply to the other side within 10 minutes. Otherwise, the communication between the indoor and outdoor unit may become abnormal and the expansion valves will be completely closed again.
- 3 Recover the refrigerant by a refrigerant reclaimer. For details, see the operation manual delivered with the refrigerant reclaimer.

## 10. CAUTION FOR REFRIGERANT LEAKS

(Points to note in connection with refrigerant leaks.)

### Introduction

**The installer and system specialist shall secure safety against leakage according to local regulations or standards. The following standards may be applicable if local regulations are not available.**

The VRV System, like other air conditioning systems, uses R-410A as refrigerant. R-410A itself is an entirely safe non-toxic, non-combustible refrigerant. Nevertheless care must be taken to ensure that air conditioning facilities are installed in a room which is sufficiently large. This assures that the maximum concentration level of refrigerant gas is not exceeded, in the unlikely event of major leak in the system and this in accordance to the local applicable regulations and standards.

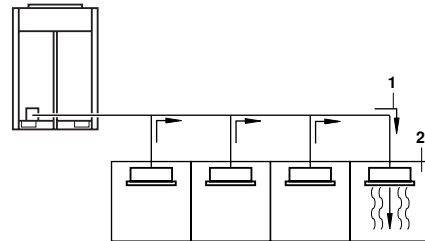
### Maximum concentration level

The maximum charge of refrigerant and the calculation of the maximum concentration of refrigerant is directly related to the humanly occupied space in to which it could leak.

The unit of measurement of the concentration is kg/m<sup>3</sup> (the weight in kg of the refrigerant gas in 1 m<sup>3</sup> volume of the occupied space).

Compliance to the local applicable regulations and standards for the maximum allowable concentration level is required.

According to the appropriate European Standard, the maximum allowed concentration level of refrigerant to a humanly space for R-410A is limited to 0.44 kg/m<sup>3</sup>.



- 1 direction of the refrigerant flow
- 2 room where refrigerant leak has occurred (outflow of all the refrigerant from the system)

**Pay special attention to places, such as a basements, etc. where refrigerant can stay, since refrigerant is heavier than air.**

### Procedure for checking maximum concentration

Check the maximum concentration level in accordance with steps 1 to 4 below and take whatever action is necessary to comply.

- 1 Calculate the amount of refrigerant (kg) charged to each system separately.

amount of refrigerant in a single unit system (amount of refrigerant with which the system is charged before leaving the factory)	+	additional charging amount (amount of refrigerant added locally in accordance with the length or diameter of the refrigerant piping)	=	total amount of refrigerant (kg) in the system
---	---	--	---	--

### NOTE

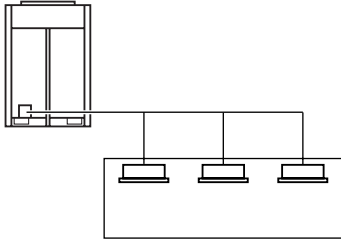


Where a single refrigerant facility is divided into 2 entirely independent refrigerant systems, use the amount of refrigerant with which each separate system is charged.

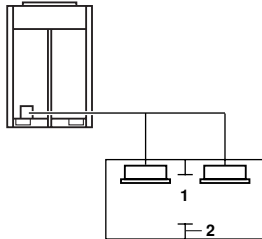
2 Calculate the smallest room volume (m<sup>3</sup>)

In a case such as the following, calculate the volume of (A), (B) as a single room or as the smallest room.

A. Where there are no smaller room divisions



B. Where there is a room division but there is an opening between the rooms sufficiently large to permit a free flow of air back and forth.



1 opening between rooms

2 partition

(Where there is an opening without a door or where there are openings above and below the door which are each equivalent in size to 0.15% or more of the floor area.)

3 Calculating the refrigerant density using the results of the calculations in steps 1 and 2 above.

total volume of refrigerant in the refrigerant system

size (m<sup>3</sup>) of smallest room in which there is an indoor unit installed



maximum concentration level (kg/m<sup>3</sup>)

If the result of the above calculation exceeds the maximum concentration level then make similar calculations for the second then third smallest room and so until the result falls short of the maximum concentration.

4 Dealing with the situations where the result exceeds the maximum concentration level.

Where the installation of a facility results in a concentration in excess of the maximum concentration level then it will be necessary to revise the system. Please consult your supplier.

### 11. DISPOSAL REQUIREMENTS

Dismantling of the unit, treatment of the refrigerant, oil and eventual other parts, should be done in accordance with the relevant local and national regulations.

## NOTES

Large grid area for taking notes.

# NOTES

