CONTENTS

Caution

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

Caution

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

Caution

The refrigerant, R407C, requires strict cautions for keeping the system clean, dry and tight.
A.Clean and dry
Foreign materials (including mineral oils such as SUNISO oil or moisture) should be prevented from getting mixed into the system.
B.Tight
R407C does not contain any chlorine, does not destroy the ozone layer, and does not reduce the earth's protection against harmful ultraviolet radiation.
R407C 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 the chapter "Refrigerant piping work" carefully and follow these procedures correctly.

Caution

Since R407C is a mixed refrigerant, the required additional refrigerant must be charged in its liquid state. (If the refrigerant is charged in a state of gas, its composition changes and the system will not work properly.)

The connected indoor units must be of the FXY--P--series, indoor units designed exclusively for R407C. If indoor units for R22 are connected, normal operation cannot be assured.

1. INTRODUCTION

This installation manual concerns VRV plus series, RSXYP. These units are designed for outdoor installation and used for cooling and heatpump applications. The units are available in 7 standard sizes with nominal cooling capacities ranging from 43.8 to 82.1kW and nominal heating capacities ranging from 43.8 to 82.1kW.

The RSXYP units can be combined with Daikin VRV series indoor units for air conditioning purposes.

The present installation manual describes the procedures for unpacking, installing and connecting the RSXYP 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 combination with indoor units is as follows:

- The possible combination of the outdoor unit with indoor units is in function of the total capacity index of these indoor units and must be within the range as specified below:

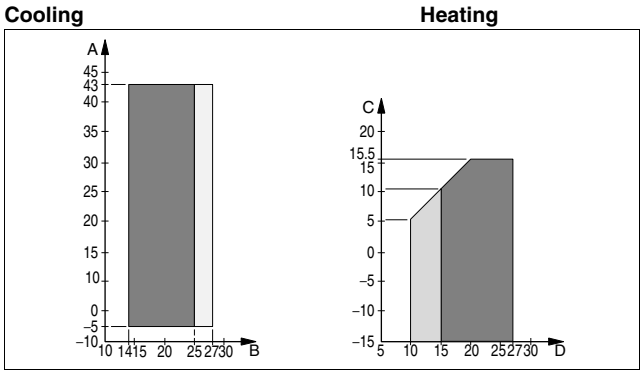
  Outdoor Unit
  RSXYP16 < RXYP8 + RXEP8 >.....200 - 520
  RSXYP18 < RXYP10 + RXEP8 >.....225 - 585
  RSXYP20 < RXYP10 + RXEP10 >.....250 - 650
  RSXYP24 < RXYP16 + RXEP8 >.....300 - 780
  RSXYP26 < RXYP16 + RXEP10 >.....325 - 845
  RSXYP28 < RXYP20 + RXEP8 >.....350 - 910
  RSXYP30 < RXYP20 + RXEP10 >.....375 - 975
- Up to 20 indoor units can be connected to 1 outdoor unit RSXYP16,18 and 20.
  Up to 32 indoor units can be connected to 1 outdoor unit RSXYP24,26,28 and 30.
- Make sure to connect indoor units designed exclusively for R407C.(FXY--P--series)
- Refer to the catalogue and/or engineering data book for model numbers of indoor units which can be connected.

1-2 Standard operation limit

The figures below assume following operating conditions for indoor and outdoor units:

Equivalent pipe length 5m
Level difference 0m

Cooling **Heating**



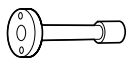
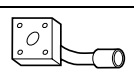
A Outdoor temperature (°CDB)
B Indoor temperature (°CWB)
C Outdoor temperature (°CWB)
D Indoor temperature (°CDB)
Range for continuous operation
Range for pull down operation
Range for warming up operation

1-3 Standard supplied accessories

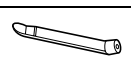
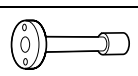
(Refer to figure 30)

Accessories are attached in the main unit , RXYP.

RSXYP16,18,20

tie-wrap (1)	9	
gas side attached pipe (2) (for connecting main and sub unit)	1	
gas side attached pipe (2) (for connecting main and sub unit)	1	
gas side attached pipe (2)	1	
gas side attached pipe (2) (for bottom piping)	1	
connection cable : Low voltage (2)	1	
connection cable : High voltage (2)	1	
installation manual (1)	1	
operation manual (1)	1	

RSXYP24,26,28,30

tie-wrap (1)	11	
gas side attached pipe (2) (for connecting main and sub unit)	1	
gas side attached pipe (2) (for connecting main and sub unit)	1	
gas side attached pipe (2) (for front-piping)	1	
liquid side attached pipe (2) (for front-piping) Do not use for RSXYP24	1	
connection cable : Low voltage (3)	1	
connection cable : High voltage (3)	1	
installation manual (1)	1	
operation manual (1)	1	

Note

- attached pipes are only for front piping. (RSXYP24-30)
- For side or bottom piping , see “Optional accessories”

1-4 Optional accessories

The outdoor unit requires purchasing the following refrigerant branch kits separately. Make sure to use exclusive parts for R407C.

Refnet header	KHRP26K11H	KHRP26K17H	KHRP26K18H
	KHRP26K37H	KHRP26K40H	
Refnet joint	KHRP26K11T	KHRP26K17T	KHRP26K18T
	KHRP26K37T	KHRP26K40T	KHRP26K75T
Pipe size reducer	KHRP26K40TP	KHRP26K40HP	KHRP26K75TP
Piping kit for side-piping	KHF30A30L		
Piping kit for bottom-piping	KHF30A30U		

Note

- Refer to chapter “Example of connection” for selection of the refrigerant branch kits you need.
- Piping kit for side and bottom piping are for RSXYP24,26,28 and 30.

1-5 Technical specifications

General		RSXY16	RSXY18	RSXY20	RSXY24
Nominal cooling capacity	(kW)	43.8	49.3	54.7	65.7
Nominal heating capacity	(kW)	43.8	49.3	54.7	65.7
Nominal input cooling/heating	(kW)	15.7 / 14.2	18.1 / 15.5	20.2 / 16.9	25.0 / 21.4
Dimensions HxWxD	(mm)				
main unit		1440×1280×690	1440×1280×690	1440×1280×690	1450×2580×690
sub unit		1220×1280×690	1220×1280×690	1440×1280×690	1220×1280×690
Weight	(kg)				
main unit		360	365	365	620
sub unit		95	95	105	95
Connections					
- refrigerant gas inlet	(inch)	$1\frac{3}{8}$ OD	$1\frac{3}{8}$ OD	$1\frac{3}{8}$ OD	$1\frac{5}{8}$ OD
	(mm)	34.9	34.9	34.9	41.3
- refrigerant liquid inlet	(inch)	$\frac{5}{8}$ flare	$\frac{6}{8}$ flare	$\frac{6}{8}$ flare	$\frac{6}{8}$ flare
	(mm)	15.9	19.1	19.1	19.1
- refrigerant gas inlet for sub units	(inch)	$1\frac{1}{8}$ OD	$1\frac{1}{8}$ OD	$1\frac{1}{8}$ OD	$1\frac{1}{8}$ OD
	(mm)	28.6	28.6	28.6	28.6
- refrigerant liquid inlet for sub units	(inch)	$\frac{1}{2}$ flare	$\frac{1}{2}$ flare	$\frac{1}{2}$ flare	$\frac{1}{2}$ flare
	(mm)	12.7	12.7	12.7	12.7

General		RSXY26	RSXY28	RSXY30
Nominal cooling capacity	(kW)	71.2	76.6	82.1
Nominal heating capacity	(kW)	71.2	76.6	82.1
Nominal input cooling/heating	(kW)	26.9 / 21.9	28.7 / 23.9	31.2 / 27.1
Dimensions HxWxD	(mm)			
main unit		1450×2580×690	1450×2580×690	1450×2580×690
sub unit		1440×1280×690	1220×1280×690	1440×1280×690
Weight	(kg)			
main unit		620	630	630
sub unit		105	95	105
Connections				
- refrigerant gas inlet	(inch)	$1\frac{5}{8}$ OD	$1\frac{5}{8}$ OD	$1\frac{5}{8}$ OD
	(mm)	41.3	41.3	41.3
- refrigerant liquid inlet	(inch)	$\frac{7}{8}$ OD	$\frac{7}{8}$ OD	$\frac{7}{8}$ OD
	(mm)	22.2	22.2	22.2
- refrigerant gas inlet for sub units	(inch)	$1\frac{1}{8}$ OD	$1\frac{1}{8}$ OD	$1\frac{1}{8}$ OD
	(mm)	28.6	28.6	28.6
- refrigerant liquid inlet for sub units	(inch)	$\frac{1}{2}$ flare	$\frac{1}{2}$ flare	$\frac{1}{2}$ flare
	(mm)	12.7	12.7	12.7

(1) Refer to the engineering data book for the complete list of specifications.
(2) The nominal cooling capacity is based on: - indoor temperature: 27°CDB/19°CWB
- outdoor temperature: 35°CDB
- pipe length: 5m
- level difference: 0m

(3) The nominal heating capacity is based on: - indoor temperature: 20°CDB
- outdoor temperature: 7°CDB/6°CWB
- pipe length: 5m
- level difference: 0m

(4) The nominal input includes total input of the unit: compressor, fan motor and control circuit.

Compressor		RSXYP16	RSXYP18	RSXYP20	RSXYP24
Model		JT236DAVTYE + JT212DATYE	JT236DAVTYE + JT265DATYE	JT236DAVTYE + JT265DATYE	JT236DAVTYE + JT236DATYE + JT236DATYE
Oil type		DAPHNE FVC68D	DAPHNE FVC68D	DAPHNE FVC68D	DAPHNE FVC68D
Oil charge volume	(l)	4.0 + 4.0	4.0 + 4.0	4.0 + 4.0	4.0 + 4.0 + 4.0
Crankcase heater	(W)	50 + 50	50 + 50	50 + 50	50 + 50 + 50
Refrigerant type		R407C	R407C	R407C	R407C
Refrigerant charge	(kg)	15.5	16.6	16.6	23.3
Condenser		**RSXYP16**	**RSXYP18**	**RSXYP20**	**RSXYP24**
Nominal air flow	(m^3/min)	320	320	340	490
Fan motor output	(W)	140 × 2,230 × 2	140 × 2,230 × 2	140 × 2,230 × 2	140 × 3,230 × 3

Compressor		RSXYP26	RSXYP28	RSXYP30
Model		JT236DAVTYE + JT236DATYE + JT236DATYE	JT236DAVTYE + JT300DATYE + JT300DATYE	JT236DAVTYE + JT300DATYE + JT300DATYE
Oil type		DAPHNE FVC68D	DAPHNE FVC68D	DAPHNE FVC68D
Oil charge volume	(l)	4.0 + 4.0 + 4.0	4.0 + 4.0 + 4.0	4.0 + 4.0 + 4.0
Crankcase heater	(W)	50 + 50 + 50	50 + 50 + 50	50 + 50 + 50
Refrigerant type		R407C	R407C	R407C
Refrigerant charge	(kg)	23.3	25.3	25.3
Condenser		**RSXYP26**	**RSXYP28**	**RSXYP30**
Nominal air flow	(m^3/min)	510	490	510
Fan motor output	(W)	140 × 3,230 × 3	140 × 3,230 × 3	140 × 3,230 × 3

1-6 Electrical specifications

Model		RSXYP 16	RSXYP 18	RSXYP 20	RSXYP 24	RSXYP 26	RSXYP 28	RSXYP 30
Power supply								
- Phase		3N ~	3N ~	3N ~	3N ~	3N ~	3N ~	3N ~
- Frequency	(Hz)	50	50	50	50	50	50	50
- Voltage	(V)	380 – 415	380 – 415	380 – 415	380 – 415	380 – 415	380 – 415	380 – 415
- Voltage tolerance	(%)	+ 6 / – 10	+ 6 / – 10	+ 6 / – 10	+ 6 / – 10	+ 6 / – 10	+ 6 / – 10	+ 6 / – 10
- Recommended fuses	(A)	45	50	60	60	70	70	70
Compressor								
- Phase		3 ~	3 ~	3 ~	3 ~	3 ~	3 ~	3 ~
- Frequency	(Hz)	50	50	50	50	50	50	50
- Voltage	(V)	380 – 415	380 – 415	380 – 415	380 – 415	380 – 415	380 – 415	380 – 415
- Nominal running current	(A)	25.4 ~ 27.8	28.3 ~ 30.9	28.4 ~ 31.0	35.2 ~ 38.4	40.5 ~ 44.2	40.7 ~ 44.4	40.7 ~ 44.4

Model		RSXYP 16	RSXYP 18	RSXYP 20	RSXYP 24	RSXYP 26	RSXYP 28	RSXYP 30
Control and fan motor								
- Phase		1 ~	1 ~	1 ~	1 ~	1 ~	1 ~	1 ~
- Frequency	(Hz)	50	50	50	50	50	50	50
- Voltage	(V)	220 – 240	220 – 240	220 – 240	220 – 240	220 – 240	220 – 240	220 – 240
- Nominal running current	(A)	4.5	4.5	4.5	6.7	6.7	6.7	6.7

2. MAIN COMPONENTS

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

3. SELECTION OF LOCATION

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

The VRV plus outdoor 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.
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 both possibilities.)
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. (See “Example of connection”.)
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.

Caution

1. An inverter air conditioner may cause electronic noise generated from AM broadcasting. Examine where to install the main air conditioner and electric wires, keeping proper distances away from stereo equipment, personal computers, etc.

   (Refer to figure 2)
   1. personal computer or radio
   2. fuse
   3. earth leak detector
   4. remote controller
   5. cool/heat selector
   6. indoor unit

   If the electric wave of AM broadcasting is particularly weak, keep distances of 3m or more and use conduit tubes for power and transmission lines.
2. In heavy snowfall areas, select an installation site where snow will not affect operation of the unit.
3. The refrigerant R407C 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 'Caution for refrigerant leaks'.

4. INSPECTING AND HANDLING THE UNIT

The units are packed in a wooden crate and attached on a wooden pallet.

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:

1. Fragile, handle the unit with care.
   Keep the unit upright in order to avoid compressor damage.
2. Lift the unit preferably with a crane and 2 belts(1) of at least 8m or 10m(RXYP16,20) long.
3. When lifting the unit with a crane, always use protectors(2) to prevent belt damage and pay attention to the position of the unit’s centre of gravity.
   (Refer to figure 3)
   1. Rope
   2. Sequencer
4. Bring the unit as close to its final installation position in its original package to prevent damage during transport.

5. UNPACKING AND PLACING THE UNIT

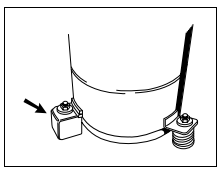
1. Remove the wooden crafte from the unit.
2. Remove the four screws fixing the unit to the pallet.

3. The unit must be installed on a solid longitudinal foundation (steelbeam frame or concrete) as indicated in figure 5.
   (Refer to figure 5)
   1. Fundamental bolt position (ϕ15 holes … 8 places)

   (Refer to figure 4:Bad Example)
   1. ✖ No!
   2. Do not use stands to support the corners.

Note Maximum height of the foundation is 150mm.

4. Lift the unit from the pallet and place it on its installation position.
5. Fasten the unit in place using four anchor bolts M12.
6. Remove the upper and lower service plate.
7. When closing the service panels take care that the tightening torque does not exceed 4.1 Nm.
8. Remove the yellow shipping stays from the compressor support as shown in the figure (2 stays per single compressor). Tighten the installation bolts firmly again afterwards.



Caution

1. Prepare a water drainage channel around the foundation to drain waste water from around the unit.
2. If the unit is to be installed on a roof, check the strength of the roof and its drainage facilities first.
3. If the unit is to be installed on a frame, install the waterproofing board within a distance of 150mm under the unit in order to prevent infiltration of water coming from under the unit.

6. REFRIGERANT PIPING

Caution

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

Note

- Use R407C only when adding refrigerant.
- Installation tools:
  Make sure to use installation tools (gauge manifold charge hose, etc.) that are exclusively used for R407C installations to withstand the pressure and to prevent foreign materials (e.g. mineral oils such as SUNISO and moisture) from mixing into the system.
  Vacuum pump (use a 2-stage vacuum pump with a non-return valve):
  1. Make sure the pump oil does not flow oppositely into the system while the pump is not working.
  2. Use a vacuum pump which can evacuate to −100.7 kPa (5Torr, −755mmHg).

6-1 Selection of piping material

1. Foreign materials inside pipes (including oils for fabrication) must be 30mg/10m or less.
2. Use the following material specification for refrigerant pipping:
   - construction material: Phosphoric acid deoxidized seamless copper for refrigerant.
   - size: Determine the proper size referring to chapter “Example of connection”.
   - The wall thickness of the refrigerant piping should comply with relevant local and national regulations. For R407C the design pressure is 3.2 MPa.
3. Make sure to use the particular branches of piping that have been selected referring to chapter “Example of connection”.

6-2 Connecting the refrigerant piping

1. Installation of refrigerant piping is possible as front connection, side connection and bottom connection.

Caution

Be sure to use the attached pipe when carrying out piping work in the field.

Separately use the optional “KHF30A30L” or “KHF30A30U” piping kit when carrying out connections for the side and bottom on RSXYP24, 26, 28, and 30.

Connect the flange on the valve on the gas side before connecting the flare nut on the valve on the liquid side. (Connecting the liquid side first will make it harder to connect the gas side.)

Be sure that the local piping does not touch other pipes, the bottom panel or side panel. Especially for the bottom and side connection, be sure to protect the gas piping with the provided insulation, to prevent it from coming into contact with the casing.

(Refer to figure 6)
1. flange
2. flare nut
3. gas side attached pipe
4. gas side optional pipe
5. liquid side attached pipe(field supply,in case of RSXYP24)
6. liquid side optional pipe(field supply,in case of RSXYP24)
7. gas side pipe(field supply)
8. liquid side pipe(field supply)
9. elbow(field supply)
10. brazing
11. knock out hole (use a hammer)

Note

1. front connection
   - Make sure to close the piping intake hole again after installation work.
   - Stop valve cover

   (Refer to figure 7)
   1. Part to cut off (Cut off the slit part.)
   2. Part to cut off (Cut grooves on the back side.)

Note

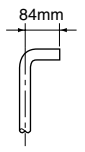
2. side connection
   - Use a hammer and knock out the hole.
   - Piping kit “KHF30A30L” is required for RSXYP24,26,28 and 30.

Note

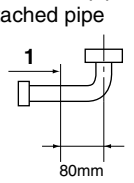
3. bottom connection
   - Piping kit “KHF30A30U” is required for RSXYP24,26,28 and 30.
   - For RSXYP16,18 and 24, bend the liquid side pipe as below and connect it to the stop valve.

     (Refer to figure 8)
     1. bending position
     2. cutting position in case of using elbow
     3. liquid side

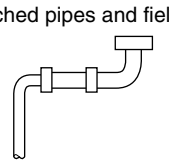
RSXYP16,18,20
Bend the gas side pipe as below.



Connect with attached pipes.
1 Cut the attached pipe



1 Cutting Position
2 Connect attached pipes and field pipe



RSXYP24,26,28,30
The diagram at right shows the opening on the underside for connecting the bottom. Note that piping connected with elbow-pipes (procured locally) cannot pass through the opening.

(Refer to figure 9)
1. Knock out hole
2. Aprx. 110mm
3. Aprx. 54mm

2. Piping between main unit (RXYP-) and sub unit (RXEP-)

- Be sure to open the cornered knock out hole on the left panel of the sub unit when connecting the branch piping between outdoor units

(Refer to figure 10)
1. Location to disconnect: the V groove part (Sub unit)
2. Knock out hole (Knock out the hole using a hammer, etc.)

(Refer to figure 11)
1. RXYP8,10 (main unit)
2. RXEP8,10 (sub unit)
3. flare nut
4. flange
5. gas side atached pipe
6. gas side branch piping (ϕ28.6)
7. gas side attached pipe
8. brazing
9. Liquid side branch piping (ϕ12.7)
10. cable (Low voltage)
11. liquid line
12. linsulation material
13. cable (High voltage)
14. gas line
15. insulation material

(Refer to figure 12)
1. RXYP16,20 (main unit)
2. RXEP8,10 (sub unit)
3. flare nut
4. flange
5. gas side attached pipe
6. gas side branch piping (ϕ28.6)
7. gas side attached pipe
8. brazing
9. Liquid side branch piping (ϕ12.7)

Note

- After brazing, pass the connection cable through the through-slots. Pass the connection cable through the through-slots only with flange disconnected. (If the flange is still connected, the connector of the connection cable will not pass through.)

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 chapter “Example of connection”.
4. For installation of the refrigerant branching kit, refer to the installation manual delivered with the kit.
   Mount the REFNET joint so that it branches either horizontally or vertically.

(Refer to figure 13)
1. (Horizontal wires)
2. (A-arrow diagram)
3. (Up to ±30° or vertically.

Mount the REFNET header so that it branches horizontally.
4. (Horizontal wires)
5. (B-arrow diagram)

5. Pipe connection

- Apply ether or ester oil around the flare portions before connecting.
- Only proceed with brazing after carrying out “Refrigerant pipe flushing” (note) or while releasing nitrogen into the refrigerant piping (note).
  If brazing is done without “Refrigerant pipe flushing” or without nitrogen being released into the piping, a thick oxidized film will form on the inside of the piping, affecting the valves and compressors in the refrigerant system, and making normal operation difficult.

Note

Refrigerant pipe flushing

Flushing removes foreign particles from the inside of pipes by means of nitroren gas pressure.

<Three main effects>
1. Removes oxidized film inside copper pipes generated by insufficient charging of nitrogen gas during brazing.
2. Removes foreign particles and moisture that entered pipes due to inadequate preparation.
3. Confirms connection of pipes between indoor and outdoor units (for both liquid and gas pipes).

<Procedure>
1. Mount a pressure reducing valve on the nitrogen cylinder.
   * Be sure to use a nitrogen gas. (Use of oxygen gas prohibited.)
2. Connect the charge hose of the pressure reducing valve to the service port of the liquid pipe of outdoor unit.
3. Mount a blind plug on indoor unit (B). Do not mount a blind plug on unit A.
4. Open the main valve of the nitrogen cylinder, and adjust the pressure reducing valve until the pressure becomes 0.5 MPa.
5. Make sure that the nitrogen gas is released through the liquid pipe of unit A.
6. Flushing
   - Close the pipe end with the palm of the hand.
   - When the pressure becomes high, move the hand quickly. (1st flushing)
   - Close the pipe end with the palm of the hand again. (Conduct the 2nd flushing.)

* During the flushing process, place a clean cloth at the pipe end, and check the content and amount of the removed foreign particles. If even a small amount of moisture is found, be sure to remove all moisture from inside the pipe. Procedure (1) Conduct flushing using a nitrogen gas (until no moisture comes out). (2) Conduct vacuum drying.

7. Close the main valve of the nitrogen cylinder.
8. Repeat the same procedure for unit B.
9. After completing the flushing for the liquid pipes, conduct flushing for the gas pipes.

(Refer to figure 14)
1. Pressure reducing valve
2. Gas pipe
3. Outdoor unit
4. Liquid pipe
5. Gas pipe
6. Liquid pipe
7. Blind plug (brass)
8. Flare nut
9. Copper pipe
10. Main valve
11. Primary side
12. Secondary side:0.5MPa
13. Nitrogen gas
14. Pressure reducing valve
15. Pressure: 0.5 MPa

- The pressure regulator for the nitrogen released when doing the brazing should be set to 0.02 MPa (0.2 kg/cm^2) or less.

(Refer to figure 15)
1. Refrigerant piping
2. Location to be brazed
3. Nitrogen
4. Taping
5. Manual valve
6. Regulator
7. Nitrogen

6. Protection against contamination when installing pipes

- Take measures to prevent foreign materials like moisture and contamination from mixing into the system.

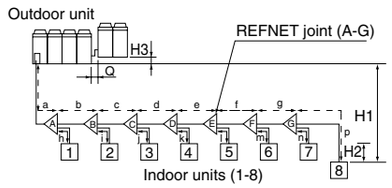
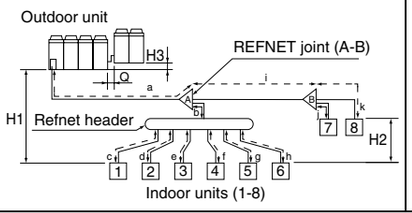
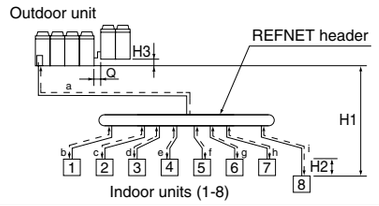
Place	Installation period	Protection method
Outdoor	More than a month	Pinch the pipe
	Less than a month	Pinch or tape the pipe
Indoor	Regardless of the period	

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

6-3 Example of connection

Connection of 8 indoor units
Heat pump system

1 indoor unit
A refnet joint
refnet header

	Branch with refnet joint	Branch with refnet joint and refnet header	Branch with refnet header
			

Maximum allowable length	Between outdoor and indoor units	Actual pipe length	Pipe length between outdoor and indoor units ≤ 100m		
			Example unit 8: a + b + c + d + e + f + g + p ≤ 100m	Example unit 6: a + b + h ≤ 100m, unit 8: a + i + k ≤ 100m	Example unit 8: i ≤ 40m
		Equivalent length	Equivalent pipe length between outdoor and indoor units ≤ 125m (assume equivalent pipe length of refnet joint to be 0.5m, that of refnet header to be 1m, calculation purposes)		
	Between outdoor unit (main) and outdoor unit (sub)	Actual pipe length	Pipe length between outdoor unit (main) and outdoor unit (sub)(Q) ≤ 5m		
Allowable height length	Between outdoor and indoor units	Difference in height	Difference in height between outdoor and indoor units (H1) ≤ 50m (≤ 40m or less when oudoor unit is located in a lower position)		
	Between adjacent indoor units	Difference in height	Difference in height between adjacent indoor units (H2) ≤ 15m		
	Between outdoor unit (main) and outdoor unit (sub)	Difference in height	Difference in height between outdoor unit (main) and outdoor unit (sub) (H3) ≤ 5m		
Allowable length after the branch		Actual pipe length	Pipe length from first refrigerant branch kit (either refnet joint or refnet header) to indoor unit ≤ 40m		
			Example unit 8: b + c + d + e + f + g + p ≤ 40m	Example unit 6: b + h ≤ 40m, unit 8:i + k ≤ 40m	Example unit 8: i ≤ 40m

Retrigerant branch kit selection

How to select the refnet joint

- When using refnet joints at the first branch counted from the outdoor unit side.
  If the system capacity is < 500, use KHRP26K40T + KHRP26K40TP.
  If the system capacity is ≥ 500, use KHRP26K75T + KHRP26K75TP.
- For refnet joints other than the first branch, select the proper branch kit model based on the total capacity index (Refer to chapter "Combination") of the indoor units installed after the first branch using the following table:

indoor capacity index	branch kit
<100	KHRP26K11T
100≤x<160	KHRP26K18T
160≤x<330	KHRP26K37T
330≤x<640	KHRP26K40T + KHRP26K40TP (Pipe size Reducer)
>640	KHRP26K75T + KHRP26K75TP (Pipe size Reducer)

How to select the refnet header

- Select the proper branch kit model based on the total capacity index (Refer to chapter "CombinationQ") of indoor units installed after the header using the following table.
- Branching is impossible between refnet header and indoor unit.
- For systems with a total capacity of 640 and over, connect a refnet joint branch.

indoor capacity index	branch kit
<100	KHRP26K11H
100≤x<160	KHRP26K18H
160≤x<330	KHRP26K37H
330≤x<640	KHRP26K40H+ KHRP26K40HP (Pipe size Reducer)

Example of downstream indoor units	example in case of refnet joint C; indoor units 3 + 4 + 5 + 6 + 7 + 8 example in case of refnet joint B indoor units 7 + 8, example in case of refnet header; indoor units 1 + 2 + 3 + 4 + 5 + 6 example in the case of refnet header; indoor units 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8

Pipe size selection

Pipe size = outer diameter x minimum wall thickness (Unit; mm).
Use the included reducing joint which matches the pipe size.

Between outdoor unit and uppermost stream refrigerant branch kit

- Select pipe size according to outdoor system name.

Pipe size connected to outdoor unit.

	liquid	gas
RSXYP16K	ϕ15.9×t1.0	ϕ34.9×t1.3
RSXYP18-20K	ϕ19.1×t1.0	ϕ34.9×t1.3
RSXYP24K	ϕ19.1×t1.0	ϕ41.3×t1.7
RSXYP26-30K	ϕ22.2×t1.2	ϕ41.3×t1.7

Between two immediately adjacent branch kits

- Select the proper pipe size based on the total capacity index (Refer to chapter "Combination") of indoor units connected downstream, using the following table.
- Select connection pipe size according to the outdoor unit (table on the bottom left). Do not select a larger pipe size.

total capacity index	liquid	gas
<100	ϕ9.5×t0.8	ϕ15.9×t1.0
100≤x<160	ϕ9.5×t0.8	ϕ19.1×t1.0
160≤x<330	ϕ12.7×t0.8	ϕ25.4×t1.2
330≤x<480	ϕ15.9×t1.0	ϕ34.9×t1.3
480≤x<640	ϕ19.1×t1.0	ϕ34.9×t1.3
≥640	ϕ19.1×t1.0	ϕ41.3×t1.7

Between refrigerant branch kit and indoor unit

- Pipe size for direct connection to indoor unit must be the same as the connection size of indoor unit.

Connection pipe size of indoor unit.

total capacity index	liquid	gas
20,25,32,40	ϕ6.4×t0.8	ϕ12.7×t0.8
50,63,80	ϕ9.5×t0.8	ϕ15.9×t1.0
100,125	ϕ9.5×t0.8	ϕ19.1×t1.0
200	ϕ12.7×t0.8	ϕ25.4×t1.2
250	ϕ12.7×t0.8	ϕ28.6×t1.2

Additional refrigerant to be charged

Calculation of additional refrigerant to be charged R (kg) is in function of the total length of liquid lines L

R=[(Lϕ22.2) × 0.39] + [(Lϕ19.1) × 0.28] + [(Lϕ15.9) × 0.19] + [(Lϕ12.7) × 0.12] + [(Lϕ9.5) × 0.06] + [(Lϕ6.4) × 0.023] +0 :RSXYP16,18,24,28
+0.4 :RSXYP30
+0.6 :RSXYP26
+0.8 :RSXYP20

Note - Round off R to 1 decimal place

Example for refrigerant branch using refnet joint and refnet header for RSXYP28

a: ϕ22.2×30m	d: ϕ9.5×10m	g: ϕ6.4×10m	j: ϕ6.4×10m
b: ϕ15.9×10m	e: ϕ9.5×10m	h: ϕ6.4×20m	k: ϕ6.4×9m
c: ϕ9.5×10m	f: ϕ9.5×10m	i: ϕ12.7×10m	

R=[30×0.39]+[10×0.19]+[10×0.12]+[40×0.06]+[49×0.023]+[0] =18.32 ⇩ 18.3kg
a b i c+d+e+f g+h+j+k

6-4 Leak test and vacuum drying

The units were checked for leaks by the manufacturer.

Confirm that the valves are firmly closed before pressure test or vacuuming.

Air tight test and vacuum drying

- Air tight test: Make sure to use nitrogen gas.
  Pressurize the liquid and gas pipes to 3.2MPa (do not pressurize more than 3.2MPa). 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 –100.7kPa (5Torr, –755mmHg).
  3 Evacuate the system from the liquid and gas pipes by using a vacuum pump for more than 2 hours and bring the system to –100.7kPa. 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.
  4 Following should be executrd 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 0.05MPa (vacuum break) with nitrogen gas and evacuate the system again using the vacuum pump for 1 hour to –100.7kPa (vacuum drying). If the system cannot be evacuated to –100.7kPa 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.

RSXYP16,18,20
⟨⟨When conducting an airtightness test⟩⟩
(Refer to figure 16-1)
8. RXYP (Main unit)
9. RXEP (Sub unit)
10. Gas side valve
11. Liquid side valve
12. Liquid side
13. Gas side
14. Connecting valve (Service port)
15. Indoor units
16. Regulator
17. Gauge manifold
18. Nitrogen
⟨⟨When vacuum drying⟩⟩
(Refer to figure 16-2)
1-8. Same as figure 16-1
9. Gauge manifold
10. Vacuum pump
RSXYP24,28,30
⟨⟨When conducting an airtightness test⟩⟩
(Refer to figure 16-3)
1-11. Same as figure 16-1
⟨⟨When vacuum drying⟩⟩
(Refer to figure 16-4)
1-10. Same as figure 16-2

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.
- Make sure to insulate the gas side connection piping and refrigerant branch kits entirely against heat, and depending on operation conditions (e.g. when performing cooling operation with an outside air temperature of ≤15°C), consider to also make a heat insulation of the liquid side connection piping and refrigerant branch kits to prevent dewing.
- 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.

Caution

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

6-6 Additional refrigerant charge

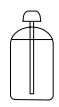
Caution

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 (R407C) is charged.
Refrigerant containers shall be opened slowly.
Always use protective gloves and protect your eyes when charging refrigerant.

- This outdoor unit is factory charged with refrigerant and depending on pipe sizes and pipe lengths some systems require additional charging of refrigerant.
- Charge the refrigerant to the liquid pipe in its liquid state. Since R407C 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.

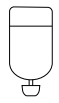
How to fill a tank with a siphon attached.

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 to be charged” in chapter “Example of connection”. And fill in the amount in the “Request for the indication of additional refrigerant charging amount and installation date” attached to the unit.
- 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:
  1. Check that gas and liquid stop valves are closed.
  2. Stop the compressor and charge the specified weight of refrigerant.
- If the outdoor unit is not in operation and the total amount cannot be charged, follow the procedures for additional refrigerant charge shown below.
- Make sure to use installation tools you exclusively use on R407C installations to withstand the pressure and to prevent foreign materials from mixing into the system.

Note

- Procedure for filling added refrigerant (Connect the refrigerant charge hose as shown in the diagram below.)
  1 After filling the refrigerant with the outdoor unit off (always fill the tank with the unit off, and then start it up, otherwise it may break), and then turn on the indoor and outdoor power.
  2 Open up the gas side valves and valves for sub unit (both gas and liquid side).

Note

- Be sure to close the liquid side valve. (Otherwise filling will be impossible.)
  3 Proceed to refrigerant adding mode by selecting “setting mode 2”. (Refer to the “CAUTION on OPERATION” on the PCboard (A1P) on the outdoor unit for settings. Operation will not be possible immediately after power is turned on (until the LED H2P goes off: up to 12 minutes).

4 Once the set amount of refrigerant has been filled, press the RETURN button on the A1P, and stop operation.
(It takes 30 minutes, but if filling is not completed in 30 minutes, re-set and start again.)
5 Remove the refrigerant charge hose and be sure to **open** up the liquid side valve all the way.

(Refer to figure 17)
1. RXYP (Main unit)
2. RXEP (Sub unit)
3. Gas side valve
4. Liquid side valve
5. Liquid side
6. Gas side
7. Connecting valve (Service port)
8. Indoor units
9. R407C
10. Tank
11. Measuring apparatus
12. Siphon-type

Caution

If the refrigerant cylinder is siphonal, set it upright while charging additional refrigerant.

7. FIELD WIRING

Caution

All field wiring and components must be installed and maintenanced 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.

7-1 Internal wiring - parts table

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

RSXYP16,18,20

A1P ..... Printed circuit board (MAIN)
A2P ..... Printed circuit board (INV)
A3P ..... Printed circuit board (SUB)
A5P ..... Printed circuit board
BS1-5 ..... Push button switch (MODE, SET, RETURN, WIRING CHECK, RESET)
C1R-4R ..... Capacitor
C5R,6R ..... Capacitor
CN-1,CN-19 ..... Relaying connector
F2C ..... Over current relay (M2C)
F1S ..... Surge Absorber
F1U,2U ..... Fuse (250V,10A) (A1P)
F1U ..... Fuse (250V,10A) (A3P)
H1P-7P ..... Pilotlamp (service monitor - orange) (A1P) H2P ; Prepare-flickering Malfunction detection-light up
H1P-4P ..... Pilotlamp (service monitor - red) (A2P)
HAP ..... Pilotlamp (service monitor - green) (A1P-3P)
INV ..... Inverter
J1HC,2HC ..... Crankcase heater
K1M,2M ..... Magnetic contactor (M1C,2C)
K1R ..... Magnetic RELAY (M1F) (A1P)
K1R ..... Magnetic RELAY (A2P)
K2R ..... Magnetic RELAY (M1F) (A1P)
K2R ..... Magnetic RELAY (A2P)
K3R ..... Magnetic RELAY (M2F) (A1P)
K4R ..... Magnetic RELAY (K2M) (A1P)
K5R ..... Magnetic RELAY (A3P)
K6R ..... Magnetic RELAY (J1HC) (A1P)
K6R ..... Magnetic RELAY (M3F) (A3P)
K7R ..... Magnetic RELAY (Y1R) (A1P)
K7R ..... Magnetic RELAY (M4F) (A3P)
K8R ..... Magnetic RELAY (Y1S) (A1P)
K9R ..... Magnetic RELAY (Y2S) (A1P)
K10R ..... Magnetic RELAY (Y3S) (A1P)
K11R ..... Magnetic RELAY (Y4S) (A1P)
K12R ..... Magnetic RELAY (Y5S) (A1P)
L1R ..... Reactor
M1C,2C ..... Motor (compressor)
MF1,2F ..... Motor (fan)
MF3,4F ..... Motor (fan)
Q1M,2M ..... Thermo switch (M1F, M2F)
Q3M,4M ..... Thermo switch (M3F, M4F)
R1 ..... Resistor
R66-69 ..... Resistor
R93,94 ..... Resistor
R1T ..... Thermistor (AIR) (A1P)
R1T ..... Thermistor (FIN) (A2P)
R2-1T,2T ..... Thermistor (coil)
R3-1T,2T ..... Thermistor (discharge)
R4-1T,2T ..... Thermistor (header)
R6-1T ..... Thermistor (suction)
SENPH ..... Pressure sensor (high)
SENPL ..... Pressure sensor (low)
S1PH,2PH ..... Pressure switch (high)
TB1,2 ..... Terminal circuit board (relay)
T1R,2R ..... Transformer (220-240V/22V)
X1M ..... Terminal strip (power)
X2M ..... Terminal strip (control)
Y1E,2E ..... Electronic expansion valve
Y1R ..... 4 way valve
Y1S ..... Solenoid valve (auxiliary condenser)
Y2S ..... Solenoid valve (hotgas)
Y3S ..... Solenoid valve (injection M1C)
Y4S ..... Solenoid valve (injection M2C)
Y5S ..... Solenoid valve (receiver)
Z1F-5F ..... Noise filter
(D M) ..... Diode module
(P C) ..... Power circuit
(P M) ..... Power module
(PRC) ..... Phase reversal detect circuit
(S D) ..... Safety devices input

RSXYP24,26,28,30

A1P ..... Printed circuit board (MAIN)
A2P ..... Printed circuit board (INV)
A3P,4P ..... Printed circuit board (SUB)
A5P ..... Printed circuit board
BS1-5 ..... Push button switch (MODE, SET, RETURN, WIRING CHECK, RESET)
C11R,12R ..... Capacitor
C21R,22R ..... Capacitor
C3R,4R ..... Capacitor
C5R,6R ..... Capacitor
CN-1,CN-19 ..... Relaying connector
F1S ..... Surge Absorber
F2C,3C ..... Over current relay (M2C,3C)
F1U,2U ..... Fuse (250V,10A) (A1P)
F1U ..... Fuse (250V,10A) (A3P,4P)
H1P-7P ..... Pilotlamp (service monitor - orange) (A1P) H2P ; Prepare-flickering Malfunction detection-light up
H1P-4P ..... Pilotlamp (service monitor - red) (A2P)
HAP ..... Pilotlamp (service monitor - green) (A1P-4P)
INV ..... Inverter
J1HC-3C ..... Crankcase heater
K1M,3M ..... Magnetic contactor (M1C,2C,3C)
K1R ..... Magnetic RELAY (M11F) (A1P)
K1R ..... Magnetic RELAY (A2P)
K1R ..... Magnetic RELAY (Y6S) (A3P)
K2R ..... Magnetic RELAY (M11F) (A1P)
K2R ..... Magnetic RELAY (A2P)
K3R ..... Magnetic RELAY (M12F) (A1P)
K4R ..... Magnetic RELAY (K2M) (A1P)
K5R ..... Magnetic RELAY (K3M) (A1P)
K5R ..... Magnetic RELAY (A3P,A4P)
K6R ..... Magnetic RELAY (J1HC) (A1P)
K6R ..... Magnetic RELAY (M21F) (A3P)
K6R ..... Magnetic RELAY (M3F) (A4P)
K7R ..... Magnetic RELAY (Y1R) (A1P)

K7R .....Magnetic RELAY (M22F) (A3P)
K7R .....Magnetic RELAY (M4F) (A4P)
K8R .....Magnetic RELAY (Y1S) (A1P)
K9R .....Magnetic RELAY (Y2S) (A1P)
K10R .....Magnetic RELAY (Y3S) (A1P)
K11R .....Magnetic RELAY (Y4S) (A1P)
K12R .....Magnetic RELAY (Y5S) (A1P)
L1R.....Reactor
M1C,2C,3C.....Motor (compressor)
MF11,12F .....Motor (fan)
MF21,22F .....Motor (fan)
MF3,4F .....Motor (fan)
Q11M,12M.....Thermo switch (M11F, M12F)
Q21M,22M.....Thermo switch (M21F, M22F)
Q3M,4M.....Thermo switch (M3F, M4F)
R1 .....Resistor
R66-69.....Resistor
R93,94 .....Resistor
R1T.....Thermistor (AIR) (A1P)
R1T.....Thermistor (FIN) (A2P)
R2-11T,12T.....Thermistor (coil)
R2-2T .....Thermistor (coil)
R3-11T-13T.....Thermistor (discharge)
R4-11T-13T.....Thermistor (header)
R6-1T .....Thermistor (suction)
SENPH .....Pressure sensor (high)
SENPL.....Pressure sensor (low)
S1PH-3PH.....Pressure switch (high)
TB1,2.....Terminal circuit board (relay)
T1R,2R .....Transformer (220-240V/22V)
X1M .....Terminal strip (power)
X2M .....Terminal strip (control)
X3M .....Terminal strip (relay)
Y1E-3E .....Electronic expansion valve
Y1R .....4 way valve
Y1S.....Solenoid valve (auxiliary condenser)
Y2S.....Solenoid valve (hotgas)
Y3S.....Solenoid valve (injection M1C)
Y4S.....Solenoid valve (injection M2C)
Y5S.....Solenoid valve (receiver)
Y6S.....Solenoid valve (injection M3C)
Z1F-6F.....Noise filter(surge absorber)
(D M) .....Diode module
(P C) .....Power circuit
(P M) .....Power module
(PRC) .....Phase reversal detect circuit
(S D) .....Safety devices input

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

7-2 Optional parts cool/heat selector

SS1.....Selector switch (fan, cool/heat)
SS2.....Selector switch (cool/heat)

Note

- Use copper conductors only.
- When using the adaptor for sequential start, refer to chapter “Examples”.
- For connection wiring to outdoor-outdoor transmission F1-F2, outdoor-indoor transmission F1-F2, refer to chapter “Examples”.
- 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 leak detector.

	Phase and frequency	Voltage	Recommended fuses	Transmission line selection
RSXYP16	3N~50Hz	380-415V	45A	0.75-1.25mm^2
RSXYP18	3N~50Hz	380-415V	50A	0.75-1.25mm^2
RSXYP20	3N~50Hz	380-415V	60A	0.75-1.25mm^2
RSXYP24	3N~50Hz	380-415V	60A	0.75-1.25mm^2
RSXYP26	3N~50Hz	380-415V	70A	0.75-1.25mm^2
RSXYP28	3N~50Hz	380-415V	70A	0.75-1.25mm^2
RSXYP30	3N~50Hz	380-415V	70A	0.75-1.25mm^2

When using residual current operated circuit breakers, be sure to use a high-speed type 200mA rated residual operating current.

Note

- Select the power supply cable in accordance with relevant local and national regulations.

7-4 General

- Make sure to connect the power source wire to the power source terminal block and to clamp it as shown in figure 19, 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.
  1. Large imbalance will shorten the life of the smoothing capacitor.
  2. 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.
  - 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 leak detector. (One that can handle higher harmonics.)
  (This unit uses an inverter, which means that an earth leak detector capable handling high harmonics in order to prevent malfunctioning of the earth leak detector itself.)
- Earth leak detector which are especially for protecting groundfaults should be used in conjunction with main switch or fuse for use with wiring.
- This unit has a negative phase protection circuit. (If it operates, only operate the unit after correcting the wiring.)

7-5 Examples

System example (Refer to figure 18)

1. field power supply
2. main switch
3. earth leak detector
4. fuse
5. cool/heat selector
6. remote controller

— power supply wiring (sheathed cable)
— transmission wiring (sheathed cable)

Field line connection (Refer to figure 19)

L1, L2, L3, N-phase of the power cord should be clamped to the safety catch using the included clamp material.
The green and yellow striped wrapped wires should be used for grounding.

1. field power supply
2. clamp the grounding wire with power supply
3. grounding screw
4. spring washer
5. flat washer
6. earth wire
7. C cup washer
8. Fix the power cord with the included clamp material to the safety catch.
9. Wiring sleeve
10. Terminal board
11. Grounding wire
12. Attach the insulating sleeve.

Field line connection between main unit (RXYP-) and sub unit (RXEP-)

Caution

In the event that the main unit and the sub unit are separated by 1000 mm or more, the attached cables cannot be used. The wiring between the outdoor units should be connected by extending the attached cable using the included connectors.

The connector must be wired to be inside the switch box.

(Refer to figure 20)
RSXYP16,18,20

1. RXYP8,10 (main unit)
2. RXEP8,10 (sub unit)
3. Power supply
4. Branch wiring between outdoor units (high voltage)
5. Branch wiring between outdoor units (low voltage)
6. insulation material
7. gas line
8. cable (high voltage)
9. insulation material
10. liquid line
11. cable (low voltage)
12. RXYP (main unit) Switch box
13. RXYP (main unit) Inverter box
14. RXEP (sub-unit)
15. Fix to the safety catch.
16. Connect the ground wire (green/yellow) to the ground terminal
17. Extended wiring (7000 mm or less)
    (Sheathed cable or 0.75 mm^2 cables)
18. Divide the low voltage wire from the high voltage wire using the wire clip on the bottom of the inverter box
19. Always separete the high voltage wiring from the low voltage wiring in the branch wiring
20. 30 mm or more
21. Connection binder

RSXYP24,26,28,30

1. RXYP16,20 (main unit)
2. RXEP8,10 (sub unit)
3. Power supply
4. Branch wiring between outdoor units (high voltage)
5. Branch wiring between outdoor units (low voltage)
6. insulation material
7. gas line
8. cable (high voltage)
9. insulation material
10. liquid line
11. cable (low voltage)
12. RXYP (main unit) Switch Box
13. RXEP (sub-unit) Switch box
14. Connect the ground wire (green/yellow) to the ground terminal
    Extended wiring (7000 mm or less)
    (Sheathed cable or 0.75 mm^2 cables)
    Always separete the high voltage wiring from the low voltage wiring in the branch wiring
15. Fix to safety catch
16. Connection binder
17. 30mm or more

Field line connection:transmission wiring and cool/heat selection

(Refer to figure 21)

1. Switch box (main unit)
2. Fix to the safety catch using the attached clamp material
3. Attached cable (between main and sub units)

Example of performing cool/heat with cool/heat selector

(Refer to figure 22)

1. Cool/heat selector (optional for heat pump unit only)
2. Outdoor unit P.C. board (A1P)
3. Take care of the polarity
4. Use the conductor of sheathed wire (2 wire) (no polarity)
5. Terminal board (field supply)
6. Indoor unit

Example of performing cool/heat setting of two or more outdoor units in block with cool/heat selector

- For the wiring shown in figure 22, be sure to use 0.75-1.25 mm^2 vinyl cords with sheath or cables (two-core). (Three-core cables can be used only for the cool/heat selector.) (Insulated thickness: 1mm or more)
- The wires shown in figure 22 are field supply.

Caution

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: 1000m
Total wiring length: 2000m
Max branches No. of branches: 16

Up to 16 branches are possible for unit-to unit cabling. No branching is allowed after branching.

(Refer to figure 23)

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”.

(Refer to figure 24)

1. Indoor unit

Setting the cool/heat operation

1. Performing cool/heat setting with the remote controller connected to the indoor unit.
   Keep the cool/heat selector switch (SS1) on the outdoor unit PC board (A1P) at the factory setting position IN/D UNIT.
   (Refer to figure 25)

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 (SS1) on the outdoor unit PC board (A1P) to OUT/D UNIT.
   (Refer to figure 26)
   1. Cool/heat selector

Caution

For low-noise operation, it is necessary to get the optional "External control adaptor for outdoor unit".
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 - optional parts) or from a knock out hole to be made in the unit's bottom plate.
  (Refer to figure 27)
  RXYP16,18,20
  1. RXYP8,10 (main unit)
  2. RXEP8,10 (sub unit)
  3. Through -slot cover
  4. Cut out the diagonal line area
  5. Power cord
  6. Separate
  7. Branch wiring between indoor and outdoor units.
  8. Branch wiring between outdoor units (high voltage)
  9. Branch wiring between outdoor units (low voltage)
  10. cable (low voltage)
  11. liquid line
  12. insulation material
  13. cable (high voltage)
  14. gas line
  15. insulation material

  RXYP24,26,28,30
  1. RXYP16,20 (main unit)
  2-15. Same as RXYP16,18,20

- If you pick the power line from the front position of the unit, proceed as follows and refer to figure 28:
  - Remove the lower frontplate (1), punch a hole in the knock hole and cut the hole (2) all the way to the slit.
  - Attach the 3 sealing pads (optional parts) (3) on the wiring mounting plate (optional parts) (4) corresponding to the overlapped area of the front plate.
  - Install the wiring mounting plate to the front side of the side plate with the 2 delivered screws.
- Pick the transmission line from the middle positioned conduit hole on the left side plate, or from the front position of the main unit (after binding it to the piping with finishing tape as in figure 29).
  (Refer to figure 29)
  1. liquid side pipe
  2. gas side pipe
  3. pipe heat insulation
  4. transmission line
  5. finishing tape

Caution

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 chapter "Field line connection".

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 don't 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 Checks before initial start-up

Caution

Make sure that the circuit breaker on the power supply panel of the installation is switched off.

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
   Keep record of the additional refrigerant charged by filling it out on the sticker on the rear of the upper front panel.
5. Insulation test of the main power circuit
   Using a megatester for 500V, check that the insulation resistance of 2MΩ or more is attained by applying a voltage of 500V 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.

8-2 Test run

Operation of stop valve

Keep all stop valves fully open. (Refer to chapter "How to operate stop valves".)

Power supply connection

Caution

In order to avoid compressor damage, it is necessary to switch on the crankcase heater for **at least six hours** before starting the compressor after a long period of standstill or for the first time.

Set all the initial settings for the test run with the power on. Be careful not to touch, under any circumstances, any button other than the push button switches (BS1-5) on the PCB(XIA) when making settings. Doing so can cause electrical shocks.

- To switch on the crankcase heater, turn on the circuit breaker.
- Set the LED on the outdoor unit PC board after turning on the circuit breaker.
- Before switching on the indoor unit(s), refer to the operation manual of the corresponding unit(s) for more details.
- Turn on the switch to indoor unit(s).
- The test run must be performed starting with cooling operation.
  Start this operation about 8 minutes after turning on the indoor unit and outdoor unit power.

Note

- Do not try to get started with the remote controller just after turning on the power. The remote controller shows "UH" and the system fails to start.
  When the outdoor temperature is below –5°C, perform the testrun in heating mode.

Operation check - Temperature regulating operation check

1. Perform the cross wiring - cross piping check as described in "CAUTIONS ON OPERATION" attached on the rear of the upper front panel.
2. Set the unit to "❄" mode using the cool/heat selector (heatpump units only) or the indoor remote controller.
3. Press the "TEST" button 4 times to set the unit to " TEST " mode operation. (" TEST " is displayed.) Pressing the "TEST" button 5 times will make the unit return to its normal operation mode.
4. Within 10minutes after having set the unit to test mode, press the "⏻" button to start the test operation. Check if the indoor and outdoor units are operating normally. If, due to compressor liquid compression, a knocking noise is heard, stop the unit immediately and start it again after a while. The test run will be stopped automatically after 30 minutes.
5. Press the "⏻" button to stop the unit.
6. Perform normal operation. Refer to the operation manual of the corresponding indoor unit(s) for details.
   - Check that cool air (or hot, in case of heating operation of heatpump units) is blown from the indoor unit.
   - Operate each indoor unit individually and check whether the corresponding outdoor unit is running.

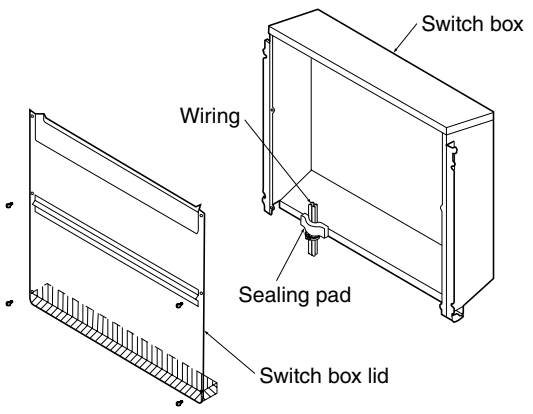
⚠ Caution

Blinking of the remote controller operation lamp means that an error occurred. The error code is displayed in the liquid crystal display and the relation between error codes and their meaning is shown in "CAUTIONS IN SERVICING" attached to the indoor unit.

The compressor is protected by a guard timer and will not restart, not even if the "⏻" button of a connected indoor unit is pressed, before the guard timer setting of 5 minutes elapsed.

Pump down operation cannot be executed because this would result in serious compressor damage.

After all the electrical work and settings are completed, check the following.



When installing the switch box lid, if there is a gap caused by the electrical wires, apply the sealing material to fill the gap to prevent bugs from entering.

Incombustibility	Equivalent to UL94HF-1

(Choose an appropriate thickness for each location.)

How to operate stop valves

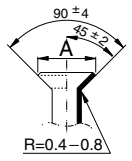
(Refer to figure 31)

1. **To open**
   - **1** Remove the cap (1) and turn the shaft (2) counterclockwise with hexagon socket screw keys (JIS B 4648 nominal size 6 mm and 10 mm).
   - **2** Turn it all the way until the shaft stops.
   - **3** Tighten the cap firmly.
2. **To close**
   - **1** Remove the cap and turn the shaft clockwise.
   - **2** Tighten the shaft firmly until it reaches the sealed area (4) of the body.
   - **3** Tighten the cap firmly.

Note

- Refer to the table at the end of this chapter for tightening torques and dimensions of the flares.
- Be sure to use both, a spanner and a torque wrench, when connecting or disconnecting pipes to or from the unit.
- When connecting a flare nut, apply ether or ester oil on the flare area (both internal and external face), and screw it with your hand a few times first.
- Use a charging hose with push rod when using the service port 5.
- Check for refrigerant gas leakage after tightening the cap.
- Make sure to apply ether oil or ester oil around the flare portions (both inner and outer face) when connecting flare nuts, and give 3 turns by hand before applying spanners.
- Make sure to keep stop valve open during operation.

FLARE SHAPE and FLARENUT TIGHTENING TORQUE

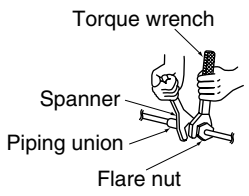
pipe size	tightening torque (N.m)	A (mm)	flare shape
ϕ6.4	14.2-17.2	8.3-8.7	
ϕ9.5	32.7-39.9	12.0-12.4	
ϕ12.7	49.5-60.3	15.4-15.8	
ϕ15.9	61.8-75.4	18.6-19.0	
ϕ19.1	97.2-118.6	22.9-23.3	

Not recommendable but in case of emergency

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 the angle shown below:

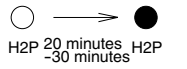


Pipe size	Further tightening angle	Recommended arm length of tool
6.4 (1/4")	60 to 90 degrees	Approx. 150 mm
9.5 (3/8")	60 to 90 degrees	Approx. 200 mm
12.7 (1/2")	30 to 60 degrees	Approx. 250 mm
15.9 (5/8")	30 to 60 degrees	Approx. 300 mm
19.1 (3/4")	20 to 35 degrees	Approx. 450 mm

Misswiring check operaMtion

(Refer to the "CAUTION ON OPERATION" on the PCB (A1P) on the outdoor unit for settings. Operation will not be possible immediately after power is turned on (until the LED H2P goes off: up to 12 minutes).

1. Use monitor mode to check the number of indoor units connected .



(Running) (Complete)

2. Press the "Wiring check" button for 5 seconds after returning to setting mode 1, and carry out the miswiring check operation. The LED H2P will light up during operation and go out when complete.

3. After completion of operation, wait about one minute, and then use monitor mode to check the number of indoor units connected again to see whether the number is the same as before. If it is not, the difference represents the number of indoor units whose wiring has been done incorrectly. Use the operation remote control to operate the indoor units, and correct the wiring on units which display “UF” on the remote control.

How to monitor the number of “MODE” connected indoor units.

1 Enter monitor mode by pressing the “MODE” button once.	H1P H2P H3P H4P H5P H6P H7P
2 Press the “SET” button until the LEDs (H2P through H7P) are as shown at right.	
3 Pressing the “RETURN” button once will display the number of indoor units on the LED display (H2P through H7P). (Binary display: example shows 7 units.)	
4 Press the “MODE” button to return to set mode 1. (The example at right shows the status when shipped from the factory.)	

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.

9. 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 R407C as refrigerant. R407C 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^3 (the weight in kg of the refrigerant gas in 1m^3 volume of the occupied space).

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

In Japan the maximum allowed concentration level of refrigerant to a humanly space for R407C is limited to 0.3 kg/m^3.

(Refer to figure 32)

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

Pay a special attention to the place, such as a basement, 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 then use the amount of refrigerant with which each separate system is charged.

2. Calculate the smallest room volume (m^3)
   Incase like 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
   (Refer to figure 33)
   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.
   (Refer to figure 34)
   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.

$$\frac{\text{total volume of refrigerant in the refrigerant system}}{\text{size (m}^3\text{) of smallest room in which there is an indoor unit installed}} \leq \text{maximum concentration level (kg/m}^3\text{)}$$

   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 Daikin supplier.

NOTES