

INSTALLATION INSTRUCTIONS

INSTRUCTIONS D'INSTALLATION

EINBAUANLEITUNG

ISTRUZIONI PER L'INSTALLAZIONE

INSTRUÇÕES DE INSTALAÇÃO

ΟΔΗΓΙΕΣ ΤΟΠΟΘΕΤΗΣΗΣ

INSTRUCCIONES DE INSTALACIÓN

INSTALLATIE-INSTRUCTIES

ИНСТРУКЦИИ ЗА МОНТАЖ

ИНСТРУКЦИИ ПО УСТАНОВКЕ

ВКАЗІВКИ ЩОДО ВСТАНОВЛЕННЯ

– **Mini VRF System Air Conditioner** –
for Refrigerant R410A

– **Climatiseur Système Mini-VRF** –
pour réfrigérant R410A

– **Mini VRF System-Klimaanlage** –
für Kühlmittel R410A

– **Condizionatore d'aria VRF Mini** –
per refrigerante R410A

– **Sistema de Ar Condicionado Mini VRF** –
para Refrigerante R410A

– **Κλιματιστικό σύστημα Mini VRF** –
για το ψυκτικό R410A

– **Acondicionador de aire del sistema Mini VRF** –
para refrigerante R410A

– **Mini VRF System Airconditioner** –
voor koelmiddel R410A

– **Климатик мини система VRF** –
за хладилен агент R410A

– **Кондиционер системы Mini VRF** –
для хладагента R410A

– **Система кондиціонування повітря Mini VRF** –
для охолоджувача R410A

Outdoor Units

U-4LE1E5, U-5LE1E5, U-6LE1E5, U-4LE1E8, U-5LE1E8, U-6LE1E8

Unités extérieures

U-4LE1E5, U-5LE1E5, U-6LE1E5, U-4LE1E8, U-5LE1E8, U-6LE1E8

Außeneinheiten

U-4LE1E5, U-5LE1E5, U-6LE1E5, U-4LE1E8, U-5LE1E8, U-6LE1E8

Unità esterne

U-4LE1E5, U-5LE1E5, U-6LE1E5, U-4LE1E8, U-5LE1E8, U-6LE1E8

Unidades exteriores

U-4LE1E5, U-5LE1E5, U-6LE1E5, U-4LE1E8, U-5LE1E8, U-6LE1E8

Εξωτερικές Μονάδες

U-4LE1E5, U-5LE1E5, U-6LE1E5, U-4LE1E8, U-5LE1E8, U-6LE1E8

Unidades exteriores

U-4LE1E5, U-5LE1E5, U-6LE1E5, U-4LE1E8, U-5LE1E8, U-6LE1E8

Buiteneenheden

U-4LE1E5, U-5LE1E5, U-6LE1E5, U-4LE1E8, U-5LE1E8, U-6LE1E8

Външни модули

U-4LE1E5, U-5LE1E5, U-6LE1E5, U-4LE1E8, U-5LE1E8, U-6LE1E8

Внешние блоки

U-4LE1E5, U-5LE1E5, U-6LE1E5, U-4LE1E8, U-5LE1E8, U-6LE1E8

Ззовнішні агрегати

U-4LE1E5, U-5LE1E5, U-6LE1E5, U-4LE1E8, U-5LE1E8, U-6LE1E8

EN

FR

DE

IT

PT

GR

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NL

BL

RU

UK

INSTALLATION INSTRUCTIONS

– Mini VRF System Air Conditioner – for Refrigerant R410A

■ R410A Models

Model No.

Outdoor Units		
4 hp	5 hp	6 hp
U-4LE1E5	U-5LE1E5	U-6LE1E5
U-4LE1E8	U-5LE1E8	U-6LE1E8

* Refrigerant R410A is used in the outdoor units.

hp = horsepower

Indoor Units		22	28	36	45	56
D1	1-Way Cassette		S-28MD1E5	S-36MD1E5	S-45MD1E5	S-56MD1E5
L1	2-Way Cassette	S-22ML1E5	S-28ML1E5	S-36ML1E5	S-45ML1E5	S-56ML1E5
U1	4-Way Cassette	S-22MU1E5	S-28MU1E5	S-36MU1E5	S-45MU1E5	S-56MU1E5
Y1	4-Way Cassette 60 × 60	S-22MY1E5	S-28MY1E5	S-36MY1E5	S-45MY1E5	S-56MY1E5
K1	Wall-Mounted	S-22MK1E5	S-28MK1E5	S-36MK1E5	S-45MK1E5	S-56MK1E5
T1	Ceiling			S-36MT1E5	S-45MT1E5	S-56MT1E5
F1	Low Silhouette Ducted	S-22MF1E5	S-28MF1E5	S-36MF1E5	S-45MF1E5	S-56MF1E5
M1	Slim Low Static Ducted	S-22MM1E5	S-28MM1E5	S-36MM1E5	S-45MM1E5	S-56MM1E5
E1	High Static Pressure Ducted					
P1	Floor Standing	S-22MP1E5	S-28MP1E5	S-36MP1E5	S-45MP1E5	S-56MP1E5
R1	Concealed Floor Standing	S-22MR1E5	S-28MR1E5	S-36MR1E5	S-45MR1E5	S-56MR1E5

Indoor Unit Type		73	90	106	140	160
D1	1-Way Cassette	S-73MD1E5				
L1	2-Way Cassette	S-73ML1E5				
U1	4-Way Cassette	S-73MU1E5		S-106MU1E5	S-140MU1E5	S-160MU1E5
Y1	4-Way Cassette 60 × 60					
K1	Wall-Mounted	S-73MK1E5		S-106MK1E5		
T1	Ceiling	S-73MT1E5		S-106MT1E5	S-140MT1E5	
F1	Low Silhouette Ducted	S-73MF1E5	S-90MF1E5	S-106MF1E5	S-140MF1E5	S-160MF1E5
M1	Slim Low Static Ducted					
E1	High Static Pressure Ducted	S-73ME1E5		S-106ME1E5	S-140ME1E5	
P1	Floor Standing	S-71MP1E5				
R1	Concealed Floor Standing	S-71MR1E5				

IMPORTANT!

Please Read Before Starting

This air conditioner must be installed by the sales dealer or installer.

This information is provided for use only by authorized persons.

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- This air conditioner shall be installed in accordance with National Wiring Regulations.
- This product is intended for professional use. Permission from the power supplier is required when installing the U-4LE1E8, U-5LE1E8, U-6LE1E8, outdoor units that are connected to a 16 A distribution network.
- This equipment complies with EN/IEC 61000-3-12 provided that the short-circuit power S_{sc} is greater than or equal to the following table at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{sc} greater than or equal to the value in the table.

	U-4LE1E5	U-5LE1E5	U-6LE1E5
S_{sc}	350 kVA	400 kVA	550 kVA

- This equipment complies with EN/IEC 61000-3-11 provided that the system impedance Z_{max} is less than or equal to the values corresponding to each model as shown in the table below at the interface point between the user's supply and the public system. Consult with the supply authority for the system impedance Z_{max} .

	U-4LE1E5	U-5LE1E5	U-6LE1E5
Z_{max}	0.298 Ω	0.298 Ω	0.298 Ω

- Pay close attention to all warning and caution notices given in this manual.



WARNING

This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.



CAUTION

This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

SPECIAL PRECAUTIONS

WARNING When Wiring




ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause **accidental injury or death**.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.
- Provide a power outlet to be used exclusively for each unit.
- ELCB must be incorporated in the fixed wiring. Circuit breaker must be incorporated in the fixed wiring in accordance with the wiring regulations.

	U-4LE1E5	U-5LE1E5	U-6LE1E5
Circuit breaker	30 A	40 A	40 A

	U-4LE1E8	U-5LE1E8	U-6LE1E8
Circuit breaker	20 A	20 A	20 A

- Provide a power outlet exclusively for each unit, and full disconnection means having a contact separation in all poles must be incorporated in the fixed wiring in accordance with the wiring rules.
- To prevent possible hazards from insulation failure, the unit must be grounded. 

When Transporting

Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut your fingers.

When Installing...

Select an installation location which is rigid and strong enough to support or hold the unit, and select a location for easy maintenance.

...In a Room

Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and water damage to walls and floors.



Keep the fire alarm and the air outlet at least 1.5 m away from the unit.

...In Moist or Uneven Locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

...In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

...In a Snowy Area (for Heat Pump-type Systems)

Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.


When Connecting Refrigerant Tubing



- When performing piping work do not mix air except for specified refrigerant (R410A) in refrigeration cycle. It causes capacity down, and risk of explosion and injury due to high tension inside the refrigerant cycle.
- Refrigerant gas leakage may cause fire.
- Do not add or replace refrigerant other than specified type. It may cause product damage, burst and injury, etc.
- Ventilate the room well, in the event that is refrigerant gas leaks during the installation. Be careful not to allow contact of the refrigerant gas with a flame as this will cause the generation of poisonous gas.
- Keep all tubing runs as short as possible.
- Use the flare method for connecting tubing.
- Apply refrigerant lubricant to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before starting the test run.
- Do not leak refrigerant while piping work for an installation or re-installation, and while repairing refrigeration parts.

Handle liquid refrigerant carefully as it may cause frostbite.

When Servicing

- Turn the power OFF at the main power box (mains) before opening the unit to check or repair electrical parts and wiring. 
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.




WARNING

- Do not clean inside the indoor and outdoor units by users. Engage authorized dealer or specialist for cleaning.
- In case of malfunction of this appliance, do not repair by yourself. Contact the sales dealer or service dealer for repair.







CAUTION

- Do not touch the air inlet or the sharp aluminum fins of the outdoor unit. You may get injured. 
- Ventilate any enclosed areas when installing or testing the refrigeration system. Escaped refrigerant gas, on contact with fire or heat, can produce dangerously toxic gas.
- Confirm after installation that no refrigerant gas is leaking. If the gas comes in contact with a burning stove, gas water heater, electric room heater or other heat source, it can cause the generation of poisonous gas.

Others



CAUTION

- Do not touch the air inlet or the sharp aluminum fins of the outdoor unit. You may get injured. 
 - Do not sit or step on the unit, you may fall down accidentally. 
 - Do not stick any object into the FAN CASE. You may be injured and the unit may be damaged. 
- 

NOTICE

The English text is the original instructions. Other languages are translations of the original instructions.

Check of Density Limit

The room in which the air conditioner is to be installed requires a design that in the event of refrigerant gas leaking out, its density will not exceed a set limit.

The refrigerant (R410A), which is used in the air conditioner, is safe, without the toxicity or combustibility of ammonia, and is not restricted by laws imposed to protect the ozone layer. However, since it contains more than air, it poses the risk of suffocation if its density should rise excessively. Suffocation from leakage of refrigerant is almost non-existent. With the recent increase in the number of high density buildings, however, the installation of multi air conditioner systems is on the increase because of the need for effective use of floor space, individual control, energy conservation by curtailing heat and carrying power, etc.

Most importantly, the multi air conditioner system is able to replenish a large amount of refrigerant compared to conventional individual air conditioners. If a single unit of the multi air conditioner system is to be installed in a small room, select a suitable model and installation procedure so that if the refrigerant accidentally leaks out, its density does not reach the limit (and in the event of an emergency, measures can be made before injury can occur).

In a room where the density may exceed the limit, create an opening with adjacent rooms, or install mechanical ventilation combined with a gas leak detection device. The density is as given below.

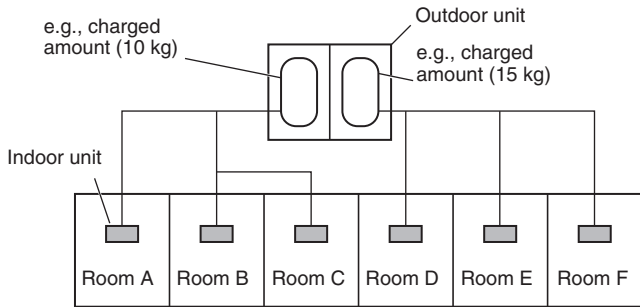
Total amount of refrigerant (kg)

$$\text{Min. volume of the indoor unit installed room (m}^3\text{)} \leq \text{Density limit (kg/m}^3\text{)}$$

The density limit of refrigerant which is used in multi air conditioners is 0.3 kg/m³ (ISO 5149).

NOTE

- If there are 2 or more refrigerating systems in a single refrigerating device, the amount of refrigerant should be as charged in each independent device. For the amount of charge in this example:

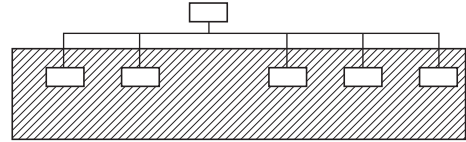


The possible amount of leaked refrigerant gas in rooms A, B and C is 10 kg.

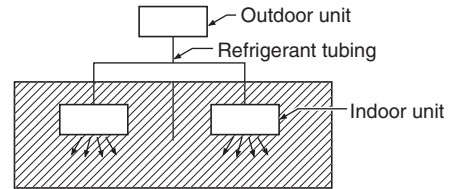
The possible amount of leaked refrigerant gas in rooms D, E and F is 15 kg.

- The standards for minimum room volume are as follows.

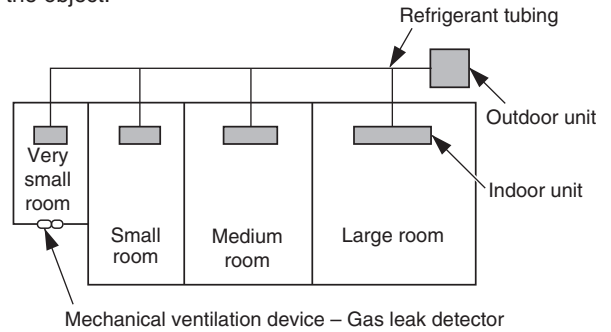
- (1) No partition (shaded portion)



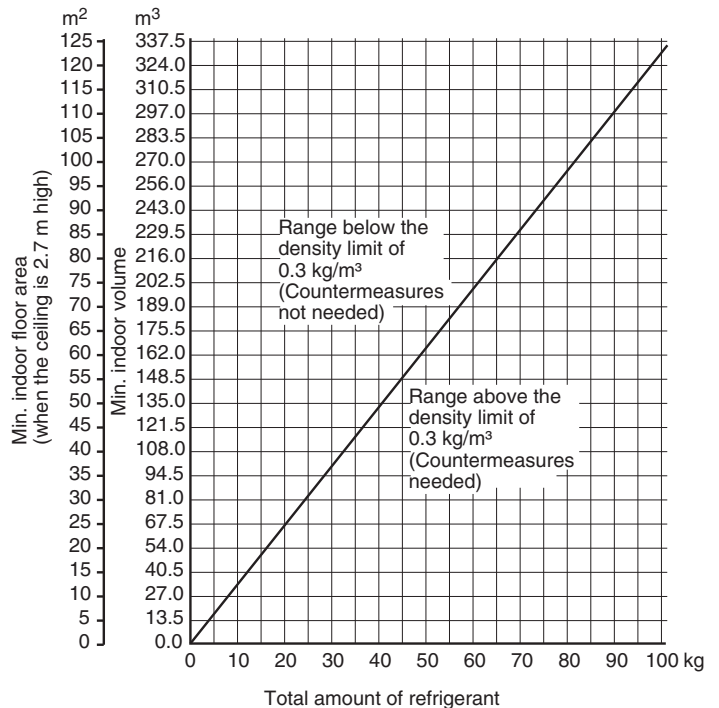
- (2) When there is an effective opening with the adjacent room for ventilation of leaking refrigerant gas (opening without a door, or an opening 0.15% or larger than the respective floor spaces at the top or bottom of the door).



- (3) If an indoor unit is installed in each partitioned room and the refrigerant tubing is interconnected, the smallest room of course becomes the object. But when mechanical ventilation is installed interlocked with a gas leakage detector in the smallest room where the density limit is exceeded, the volume of the next smallest room becomes the object.



- The minimum indoor floor space compared with the amount of refrigerant is roughly as follows: (When the ceiling is 2.7 m high)



Precautions for Installation Using New Refrigerant

1. Care regarding tubing

1-1. Process tubing

- Material: Use C1220 phosphorous deoxidized copper specified in JIS H3300 "Copper and Copper Alloy Seamless Pipes and Tubes".
- **Tubing size: Be sure to use the sizes indicated in the table below.**
- Use a tube cutter when cutting the tubing, and be sure to remove any flash. This also applies to distribution joints (optional).
- When bending tubing, use a bending radius that is 4 times the outer diameter of the tubing or larger.



Use sufficient care in handling the tubing. Seal the tubing ends with caps or tape to prevent dirt, moisture, or other foreign substances from entering. These substances can result in system malfunction.

Unit: mm

Material		O				
Copper tube	Outer diameter	6.35	9.52	12.7	15.88	19.05
	Wall thickness	0.8	0.8	0.8	1.0	1.2

1-2. Prevent impurities including water, dust and oxide from entering the tubing. Impurities can cause R410A refrigerant deterioration and compressor defects. Due to the features of the refrigerant and refrigerating machine oil, the prevention of water and other impurities becomes more important than ever.

2. Be sure to recharge the refrigerant only in liquid form.

- 2-1. Since R410A is a non-azeotrope, recharging the refrigerant in gas form can lower performance and cause defects of the unit.
- 2-2. Since refrigerant composition changes and performance decreases when gas leaks, collect the remaining refrigerant and recharge the required total amount of new refrigerant after fixing the leak.

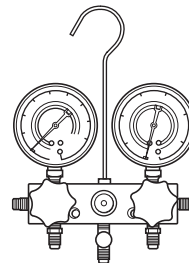
3. Different tools required

- 3-1. Tool specifications have been changed due to the characteristics of R410A. Some tools for R22- and R407C-type refrigerant systems cannot be used.

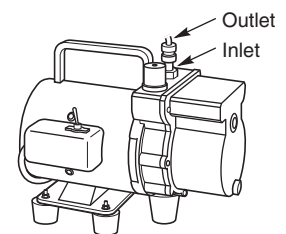
Item	New tool?	R407C tools compatible with R410A?	Remarks
Manifold gauge	Yes	No	Types of refrigerant, refrigerating machine oil, and pressure gauge are different.
Charge hose	Yes	No	To resist higher pressure, material must be changed.
Vacuum pump	Yes	Yes	Use a conventional vacuum pump if it is equipped with a check valve. If it has no check valve, purchase and attach a vacuum pump adapter.
Leak detector	Yes	No	Leak detectors for CFC and HCFC that react to chlorine do not function because R410A contains no chlorine. Leak detectors for HFC134a can be used for R410A.
Flaring oil	Yes	No	For systems that use R22, apply mineral oil (Suniso oil) to the flare nuts on the tubing to prevent refrigerant leakage. For machines that use R407C or R410A, apply synthetic oil (ether oil) to the flare nuts.

* Using tools for R22 and R407C and new tools for R410A together can cause defects.

Manifold gauge



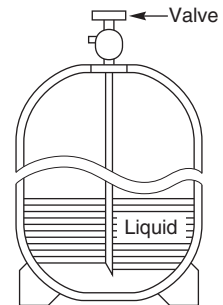
Vacuum pump



3-2. Use R410A exclusive cylinder only.

Single-outlet valve

(with siphon tube)
Liquid refrigerant should be recharged with the cylinder standing on end as shown.



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1. GENERAL

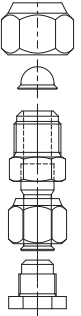


This booklet briefly outlines where and how to install the air conditioning system. Please read over the entire set of instructions for the indoor and outdoor units and make sure all accessory parts listed are with the system before beginning.

1-1. Tools Required for Installation (not supplied)

1. Flathead screwdriver
2. Phillips head screwdriver
3. Knife or wire stripper
4. Tape measure
5. Carpenter's level
6. Sabre saw or key hole saw
7. Hacksaw
8. Core bits
9. Hammer
10. Drill
11. Tube cutter
12. Tube flaring tool
13. Torque wrench
14. Adjustable wrench
15. Reamer (for deburring)
16. Hexagonal wrench (4 mm and 5 mm)
17. Pliers
18. Cutting pliers

1-2. Accessories Supplied with Outdoor Unit

Table 1-1 (Outdoor Unit)

Part name	Figure	Q'ty		
		U-4LE1E5 U-4LE1E8 (4 hp)	U-5LE1E5 U-5LE1E8 (5 hp)	U-6LE1E5 U-6LE1E8 (6 hp)
Tube Discharge Assy		0	0	1
Plastic bar (L=115 mm)		2	2	2
Instruction manual		1	1	1

hp = horsepower

1-3. Type of Copper Tube and Insulation Material

If you wish to purchase these materials separately from a local source, you will need:

1. Deoxidized annealed copper tube for refrigerant tubing.
2. Foamed polyethylene insulation for copper tubes as required to precise length of tubing. Wall thickness of the insulation should be not less than 8 mm.
3. Use insulated copper wire for field wiring. Wire size varies with the total length of wiring. Refer to **4. ELECTRICAL WIRING** for details.



Check local electrical codes and regulations before obtaining wire. Also, check any specified instructions or limitations.

1-4. Additional Materials Required for Installation

1. Refrigeration (armored) tape
2. Insulated staples or clamps for connecting wire (See your local codes.)
3. Putty
4. Refrigeration tubing lubricant
5. Clamps or saddles to secure refrigerant tubing
6. Scale for weighing

1-5. Tubing Size

Table 1-2 Main Tubing Size (LA)

	4 hp	5 hp	6 hp
System horsepower	4	5	6
Gas tubing (mm)	ø15.88		ø19.05
Liquid tubing (mm)	ø9.52		

Unit: mm, hp = horsepower

Note : If the system consists of only one indoor unit with an outdoor 6HP, the main tube of the unit (LA) should be ø19.05. Convert ø19.05 to ø15.88 using a reducer (field supply) close to the indoor unit and then make the connection.

Table 1-3 Main Tubing Size After Distribution (LB, LC...)

Total capacity after distribution	Below kW	7.1 (2.5 hp)	12.1 (4 hp)	14.0 (5 hp)	15.5 (6 hp)
	Over kW	—	7.1(2.5 hp)		
Tubing size	Gas tubing (mm)	ø12.7	ø15.88	ø19.05	
	Liquid tubing (mm)	ø9.52	ø9.52		

Unit: mm, hp = horsepower

Note : In case the total capacity of connected indoor units exceeds the total capacity of the outdoor units, select the main tubing size for the total capacity of the outdoor units.

Table 1-4 Indoor Unit Tubing Connection (Q1, Q2... Qn-1)

Indoor unite type	22	28	36	45	56	73	90	106	140	160
Gas tubing (mm)	ø12.7						ø15.88			
Liquid tubing (mm)	ø6.35						ø9.52			

Unit: mm

1-6. Straight Equivalent Length of Joints

Design the tubing system by referring to the following table for the straight equivalent length of joints.

Table 1-5 Straight Equivalent Length of Joints






Gas tubing size (mm)		12.7	15.88	19.05
90° elbow		0.30	0.35	0.42
45° elbow		0.23	0.26	0.32
U-shape tube bend (R60 – 100 mm)		0.90	1.05	1.26
Trap bend		2.30	2.80	3.20
Y-branch distribution joint		Equivalent length conversion not needed.		
Ball valve for service		Equivalent length conversion not needed.		

Table 1-6 Required Copper Tubing Dimensions Unit: mm

Material		O				
Copper tubing	Outer diameter	6.35	9.52	12.7	15.88	19.05
	Wall thickness	0.8	0.8	0.8	1.0	1.2

1-7. Additional Refrigerant Charge

Additional refrigerant charge amount is calculated from the liquid tubing total length as follows.

Table 1-7 Amount of Refrigerant Charge Per Meter, According to Liquid Tubing Size

Liquid tubing size	Amount of refrigerant charge/m (g/m)
ø6.35	26
ø9.52	56

Required amount of charge
 = (Amount of refrigerant charge per meter of each size of liquid tube × its tube length) + (...) + (...)

* Always charge accurately using a scale for weighing.

Table 1-8 Refrigerant Charge Amount at Shipment (for outdoor unit)

4 hp	5 hp	6 hp
3.5	3.5	3.5

Unit: kg, hp = horsepower

1-8. System Limitations

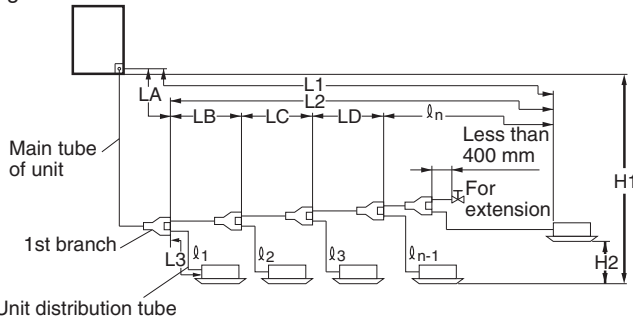
Table 1-9 System Limitations

Outdoor units	4 hp	5 hp	6 hp
Number of max. connectable indoor units	6	8	9
Max. allowable indoor/outdoor capacity ratio	50 – 130%		

hp = horsepower

1-9. Tubing Length

Select the installation location so that the length and size of refrigerant tubing are within the allowable range shown in the figure below.



- ☞ Distribution joint (CZ-P160BK2)
- ⊕ Ball valve (field supply)

Note: Do not use commercially available T-joints for the liquid tubing.

* Be sure to use special R410A distribution joints (CZ-P160BK2 : purchased separately) for outdoor unit connections and tubing branches.

R410A distribution joint
 CZ-P160BK2 (for indoor unit)

Table 1-10 Ranges that Apply to Refrigerant Tubing Lengths and to Differences in Installation Heights

Items	Marks	Contents	Length (m)
Allowable tubing length	L1	Max. tubing length	≤ 120
		Equivalent length	≤ 140
	ΔL (L2 – L3)	Difference between max. length and min. length from the No.1 distribution joint	≤ 40
	l ₁ , l ₂ ...l _n	Max. length of each distribution tube	≤ 30
Allowable elevation difference	H1	When outdoor unit is installed higher than indoor unit	≤ 50
		When outdoor unit is installed lower than indoor unit	≤ 40
	H2	Max. difference between indoor units	≤ 15

L = Length, H = Height



WARNING

Always check the gas density limit for the room in which the unit is installed.

1-10. Check of Limit Density

When installing an air conditioner in a room, it is necessary to ensure that even if the refrigerant gas accidentally leaks out, its density does not exceed the limit level for that room.

If the density could exceed the limit level, it is necessary to provide an opening between the unit and the adjacent room, or to install mechanical ventilation which is interlocked with the leak detector.

(Total refrigerant charged amount: kg)

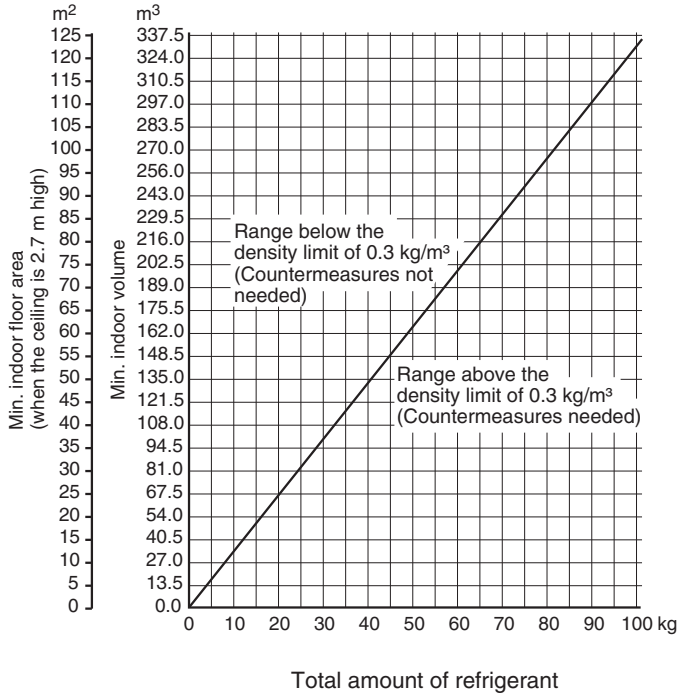
(Min. indoor volume where indoor unit is installed: m³)

≤ Limit density 0.3 (kg/m³)

The limit density of refrigerant which is used in this unit is 0.3 kg/m³ (ISO 5149).

The shipped outdoor unit comes charged with the amount of refrigerant fixed for each type, so add it to the amount that is charged at the field. (For the refrigerant charge amount at shipment, refer to the unit's nameplate.)

Minimum indoor volume & floor area relative to the amount of refrigerant are roughly as given in the following table.



CAUTION

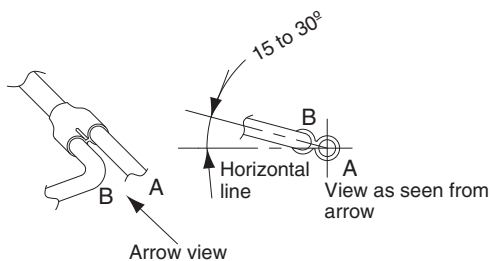
Pay special attention to any location, such as a basement, etc. where leaking refrigerant can accumulate, since refrigerant gas is heavier than air.

1-11. Installing Distribution Joint

- Refer to "HOW TO ATTACH DISTRIBUTION JOINT" enclosed with the optional distribution joint kit (CZ-P160BK2).
- In order to prevent accumulation of refrigerant oil in stopped units, if the main tubing is horizontal then each branch tubing length should be at an angle that is greater than horizontal. If the main tubing is vertical, provide a raised starting portion for each branch.
- If there are height differences between indoor units or if branch tubing that follows a distribution joint is connected to only 1 unit, a trap or ball valve (field supply) must be added to that distribution joint. (When adding the ball valve, locate it within 40 cm of the distribution joint.)

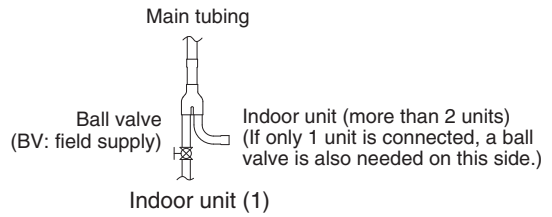
If a trap or ball valve (field supply) is not added, do not operate the system before repairs to a malfunctioning unit are completed. (The refrigerant oil sent through the tubing to the malfunctioning unit will accumulate and may damage the compressor.)

Tube branching methods (horizontal use)

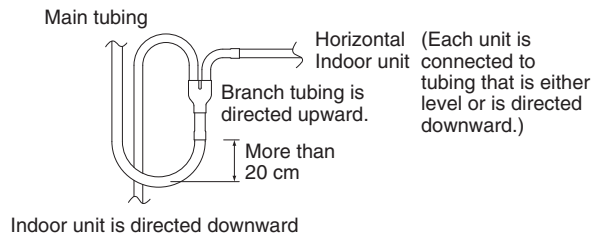


Types of vertical trap specifications

(When using ball valve (field supply))



(When not using ball valve)



1-12. Optional Distribution Joint Kit

See the installation instructions packaged with the distribution joint kit for the installation procedure.

Table 1-11

Model name	Cooling capacity after distribution	Remarks
CZ-P160BK2	22.4 kW or less	For indoor unit

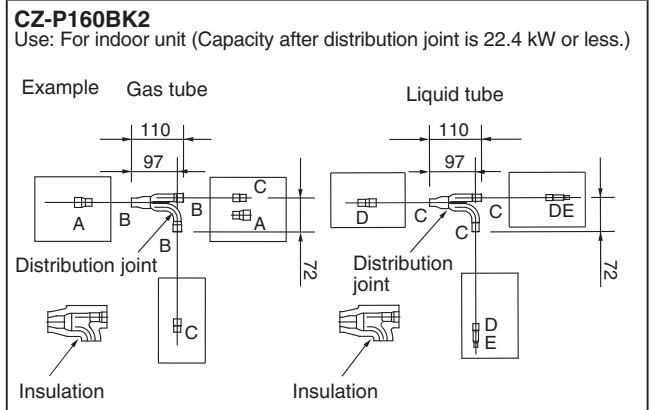


Table 1-12 Size of connection point on each part (shown are inside diameters of tubing)

Size	Part A	Part B	Part C	Part D	Part E
mm	ø19.05	ø15.88	ø12.7	ø9.52	ø6.35

Unit: mm

1-13. Example of Tubing Size Selection and Refrigerant Charge Amount

Additional refrigerant charging

Based on the values in Tables 1-2, 1-3, 1-4 and 1-7, use the liquid tubing size and length, and calculate the amount of additional refrigerant charge using the formula below.

$$\text{Required additional refrigerant charge (kg)} = [56 \times (a) + 26 \times (b)] \times 10^{-3}$$

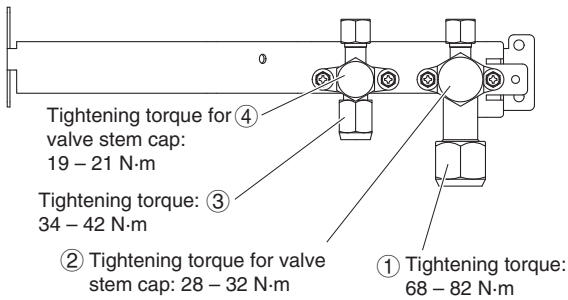
- (a): Liquid tubing Total length of ø9.52 (m)
- (b): Liquid tubing Total length of ø6.35 (m)

● Charging procedure

Be sure to charge with R410A refrigerant **in liquid form**

1. After performing a vacuum, charge with refrigerant from the liquid tubing side. At this time, all valves must be in the “fully closed” position.
2. If it was not possible to charge the designated amount, operate the system in Cooling mode while charging with refrigerant from the gas tubing side. (This is performed at the time of the test run. For this, all valves must be in the “fully open” position.)
Charge with R410A refrigerant in liquid form.
With R410A refrigerant, charge while adjusting the amount being fed a little at a time in order to prevent liquid refrigerant from backing up.

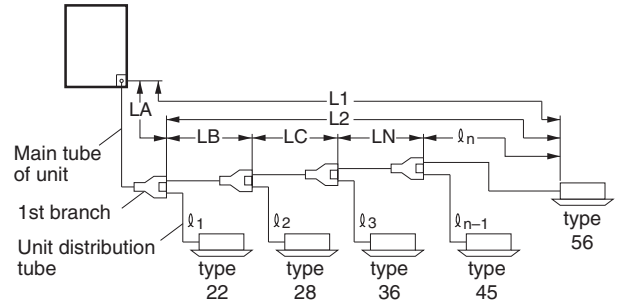
- After charging is completed, turn all valves to the “fully open” position.
- Replace the tubing covers as they were before.



⚠ CAUTION

1. R410A additional charging absolutely must be done through liquid charging.
2. The R410A refrigerant cylinder has a gray base color, and the top part is pink.
3. The R410A refrigerant cylinder includes a siphon tube. Check that the siphon tube is present. (This is indicated on the label at the top of the cylinder.)
4. Due to differences in the refrigerant, pressure, and refrigerant oil involved in installation, it is not possible in some cases to use the same tools for R22 and for R410A.

Example:



● Example of each tubing length

Main tubing	Distribution joint tubing	
LA = 40 m	Indoor side	
LB = 5 m	l 1 = 5 m	l 4 = 6 m
LC = 5 m	l 2 = 5 m	l 5 = 5 m
LD = 15 m	l 3 = 2 m	

● Obtain charge amount for each tubing size

Note that the charge amounts per 1 meter are different for each liquid tubing size.

$$\begin{aligned} \text{ø9.52} &\rightarrow \text{LA} + \text{LB} + \text{LC} + \text{LD} : 65 \text{ m} \times 0.056 \text{ kg/m} = 3.64 \text{ kg} \\ \text{ø6.35} &\rightarrow \text{l}1 + \text{l}2 + \text{l}3 + \text{l}4 + \text{l}5 : 23 \text{ m} \times 0.026 \text{ kg/m} = 0.598 \text{ kg} \end{aligned}$$

Total 4.238 kg

Additional refrigerant charge amount is 4.238 kg.

⚠ CAUTION

Be sure to check the limit density for the room in which the indoor unit is installed.

Checking of limit density

Density limit is determined on the basis of the size of a room using an indoor unit of minimum capacity. For instance, when an indoor unit is used in a room (floor area $7.43 \text{ m}^2 \times$ ceiling height $2.7 \text{ m} =$ room volume 20.06 m^3), the minimum room volume should be 25.8 m^3 ($7.738 \text{ kg} \div 0.3 \text{ kg/m}^3$) for refrigerant of 7.738 kg ($3.5 \text{ kg} + 4.238 \text{ kg}$). Accordingly, openings such as louvers are required for this room.

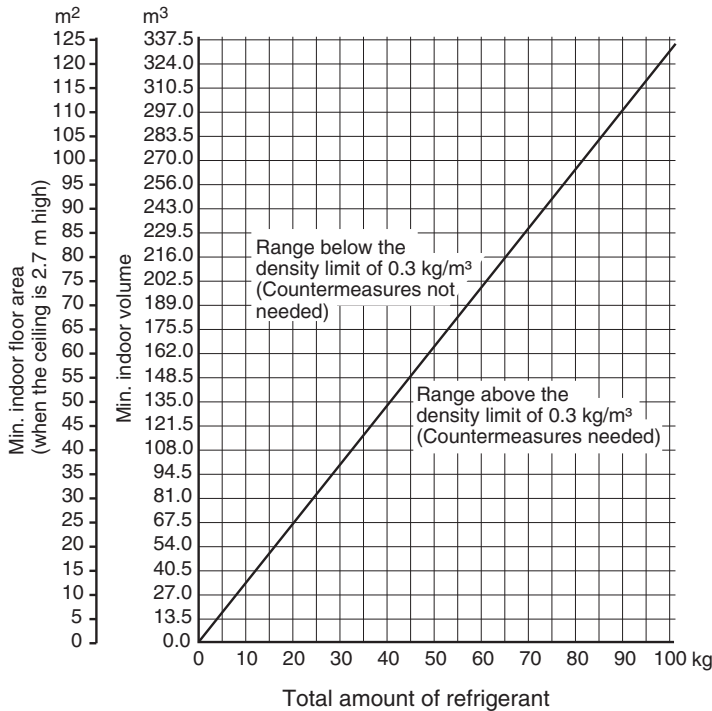
<Determination by calculation>

Overall refrigerant charge amount for the air conditioner: kg

(Minimum room volume for indoor unit: m^3)

$$= \frac{4.238 \text{ (kg)} + 3.5 \text{ (kg)}}{20.06 \text{ (m}^3\text{)}} = 0.39 \text{ (kg/m}^3\text{)} \geq 0.3 \text{ (kg/m}^3\text{)}$$

Therefore, openings such as louvers are required for this room.



2. SELECTING THE INSTALLATION SITE

2-1. Outdoor Unit

AVOID:

- heat sources, exhaust fans, etc. (Fig. 2-1)
- damp, humid or uneven locations
- indoors (no-ventilation location)

DO:

- choose a place as cool as possible.
- choose a place that is well ventilated and outside air temperature does not exceed maximum 45°C constantly.
- allow enough room around the unit for air intake/exhaust and possible maintenance. (Figs. 2-2, 2-3, 2-4)
- use lug bolts or equal to bolt down unit, reducing vibration and noise.

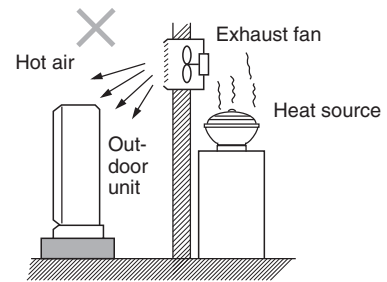
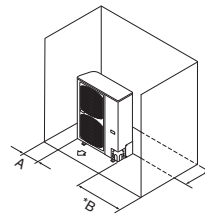


Fig. 2-1

Installation space for outdoor unit

Install the outdoor unit with a sufficient space around the outdoor unit for operation and maintenance.

- (1) Obstructions on the left side, right side and rear side (Front side and above the unit are opened). (Fig. 2-2)

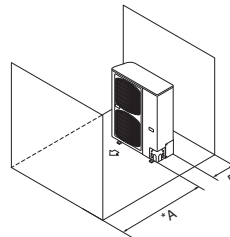


A	*B	C
15 cm or more	25 cm or more	20 cm or more

Fig. 2-2

- * The outdoor units require necessary space to unscrew on the rear side for maintenance and if a sufficient maintenance space is provided on the rear side (40 cm), the space of over 15 cm is enough at the right side.

- (2) Obstructions on the front side and rear side (Left side, right side and above the unit are opened). (Fig. 2-3)

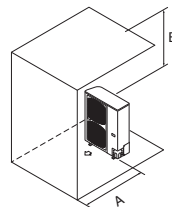


*A	B
50 cm or more	15 cm or more

Fig. 2-3

- * For compressor replacement, 50 cm or more is required on the front side even when using the air discharge chamber.

- (3) Obstructions on the front side and above the unit (Left side, right side and rear side are opened). (Fig. 2-4)



A	B
50 cm or more	30 cm or more

Fig. 2-4

In case of multiple installations

- Provide a solid base (concrete block, 10 × 40 cm beams or equal), a minimum of 15 cm above ground level to reduce humidity and protect the unit against possible water damage and decreased service life. (Fig. 2-5)
- Use lug bolts or equal to bolt down unit, reducing vibration and noise.

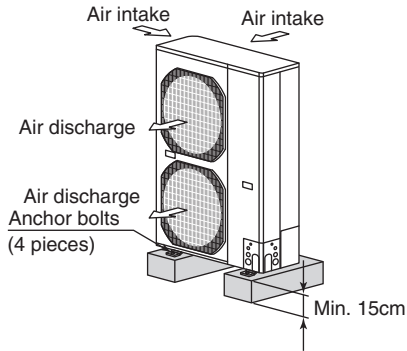


Fig. 2-5

2-2. Air-Discharge Chamber for Top Discharge

Be sure to install an air-discharge chamber in the field when:

- it is difficult to keep a space of min. 50 cm between the air discharge outlet and an obstacle.
- the air discharge outlet is facing a sidewalk and discharged hot air may annoy passers-by. Refer to Fig. 2-6.

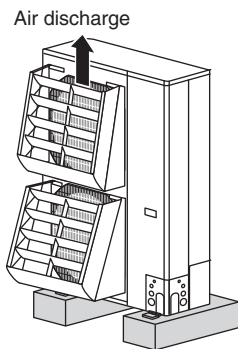


Fig. 2-6

In regions with significant snowfall, the outdoor unit should be provided with a platform and snow-proof duct.

2-3. Installing the Unit in Heavy Snow Areas

In locations with strong wind, snow-proof ducting should be fitted and direct exposure to the wind should be avoided as much as possible.

■ Countermeasures against snow and wind

In regions with snow and strong wind, the following problems may occur when the outdoor unit is not provided with a platform and snow-proof ducting:

- The outdoor fan may not run and damage to the unit may occur.
- There may be no air flow.
- The tubing may freeze and burst.
- The condenser pressure may drop because of strong wind, and the indoor unit may freeze.

2-4. Precautions for Installation in Heavy Snow Areas

- The platform should be higher than the max. snow depth. (Fig. 2-7)

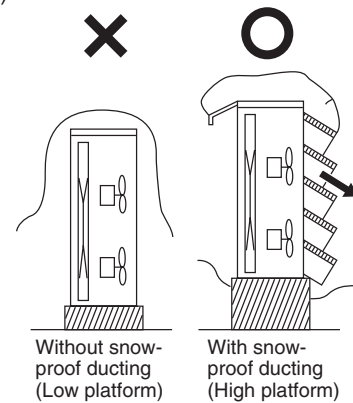
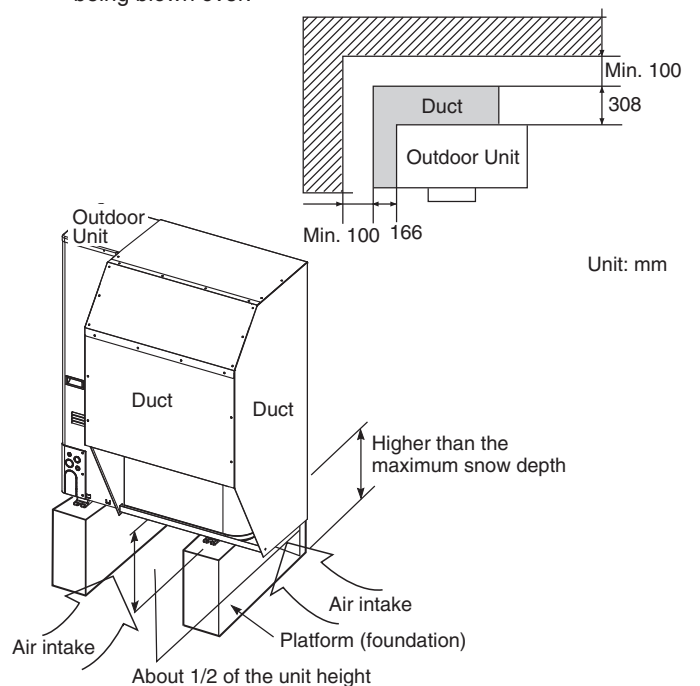


Fig. 2-7

- The 2 anchoring feet of the outdoor unit should be used for the platform, and the platform should be installed beneath the air intake side of outdoor unit.
- The platform foundation must be firm and the unit must be secured with anchor bolts.
- In case of installation on a roof subject to strong wind, countermeasures must be taken to prevent the unit from being blown over.



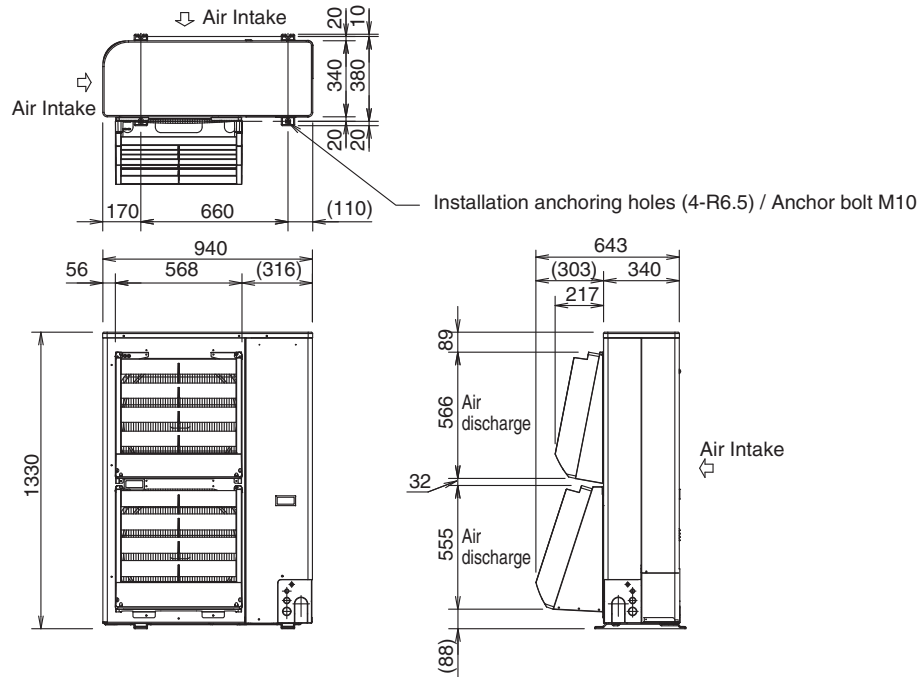
Unit: mm

Fig. 2-8

2-5. Dimensions of Air-Discharge Chamber

Reference diagram for air-discharge chamber (field supply)

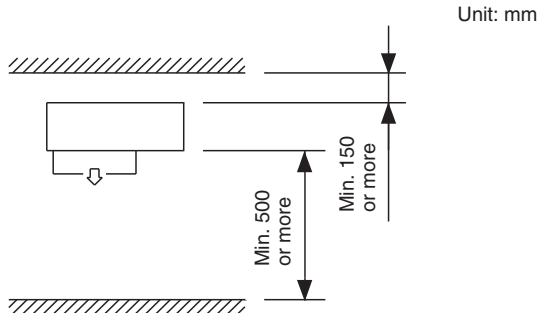
Unit: mm



Required space around outdoor unit

If the air discharge chamber is used, the space shown below must be secured around the outdoor unit. If the unit is used without the required space, a protective device may activate, preventing the unit from operating.

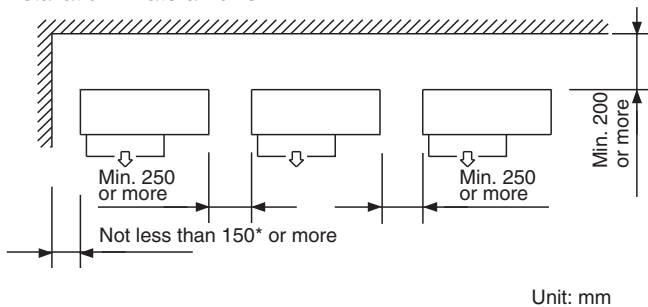
(1) Single-unit installation



The top and both sides must remain open. If there are obstacles to the front and rear of the outdoor unit, the obstacle at either the front or rear must be no taller than the height of the outdoor unit.

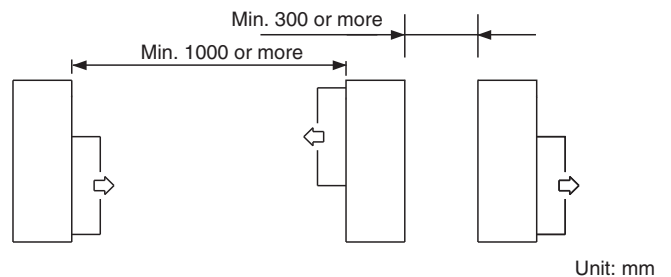
(2) Multiple-unit installation

Installation in lateral rows



Installation in front-rear rows

Installation with intakes facing intakes or outlets facing outlets



NOTE

- The amount of space is required for removing the screws on the rear of the unit. If in case the sufficient space for maintenance is ensured on the rear of the outdoor unit, installation is possible with the space of both sides of not less than 150mm where marked with * mark.

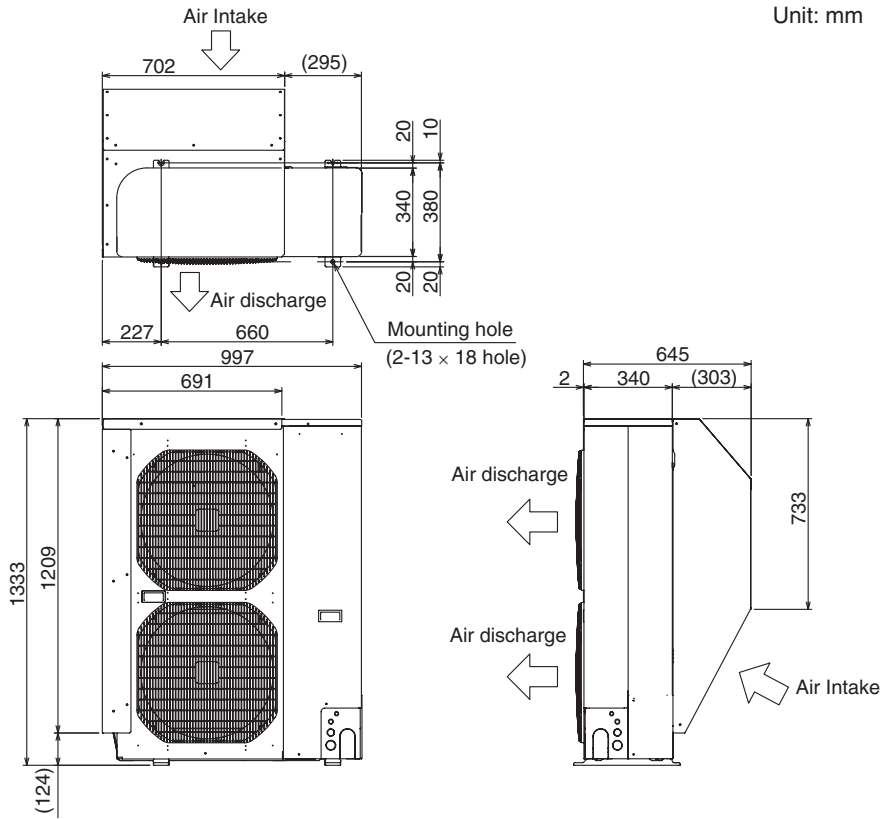
CAUTION The front and top must remain open. The obstacles must be no taller than the height of the outdoor unit.



The front and both sides must remain open.

2-6. Dimensions of Snow-Proof Vents

Reference diagram for snow-proof vents (field supply)

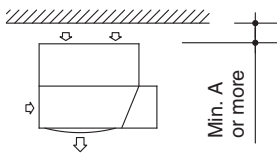


Required space around outdoor unit

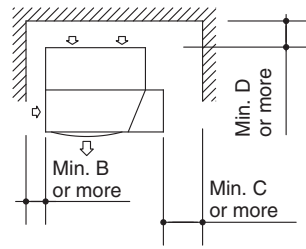
[Obstacle to the rear of unit]

● Top is open:

(1) Single-unit installation



(2) Obstacles on both sides



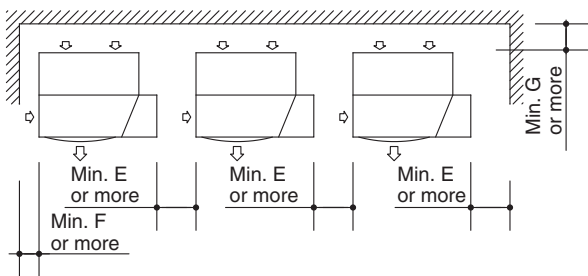
Unit: mm

A	B	C	D	E	F	G
150	150	250*	200	250	150	200

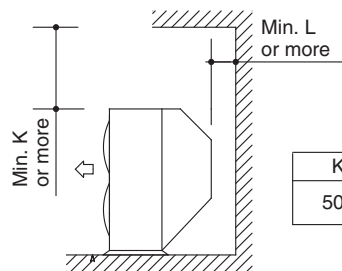
Notes:

- In cases 2 and 3 the height of the obstacle must be no taller than the height of the outdoor unit.
- The amount of space is required for removing the screw on the rear of the unit. If in case the sufficient space for maintenance is ensured on the rear of the outdoor unit, installation is possible with the space of both sides of not less than 150mm where marked with * mark.

(3) Multiple-unit installation (2 or more units)



● Top is blocked by an obstacle:



Unit: mm

K	L
500	150

[Obstacle to the front of unit]

● **Top is open:**

(1) Single-unit installation

H	I	J
500	250*	1000

(2) Multiple-unit installation (2 or more units)

Note: The amount of space is required for removing the screws on the rear of the unit. If in case the sufficient space for maintenance is ensured on the rear of the outdoor unit, installation is possible with the space of both sides of not less than 150mm where marked with * mark.

● **Top is blocked by an obstacle:**

M	N
500	300

[Obstacle to the front and rear of unit]

● **The top and both sides must remain open. Either the obstacle to the front or the obstacle to the rear must be no taller than the height of the outdoor unit.**

(1) Single-unit installation

O	P
500	150

Dimension Q
If a snow protection duct is attached after the unit is installed, verify that dimension Q is 500 mm or more.

(2) Obstacles on both sides
Installation is possible with the maximum 3 outdoor units.

Note: The amount of space is required for removing the screws on the rear of the unit. If in case the sufficient space for maintenance is ensured on the rear of the outdoor unit, installation is possible with the space of both sides of not less than 150mm where marked with * mark.

[Installation in front-rear rows]

● **The top and both sides must remain open. Either the obstacle to the front or the obstacle to the rear must be no taller than the height of the outdoor unit.**

3. HOW TO INSTALL THE OUTDOOR UNIT

3-1. Installing the Outdoor Unit

- Use concrete or a similar material to create the base, and ensure good drainage.
- Ordinarily, ensure a base height of 5 cm or more. If a drain pipe is used, or for use in cold-weather regions, ensure a height of 15 cm or more at the feet on both sides of the unit. (In this case, leave clearance below the unit for the drain pipe, and to prevent freezing of drainage water in cold-weather regions.)
- Refer to Fig. 3-1 for the anchor bolt dimensions.
- Be sure to anchor the feet with anchor bolts (M10). In addition, use anchoring washers on the top side. (Use large square 32 × 32 SUS washers with JIS nominal diameter of 10.) (Field supply)

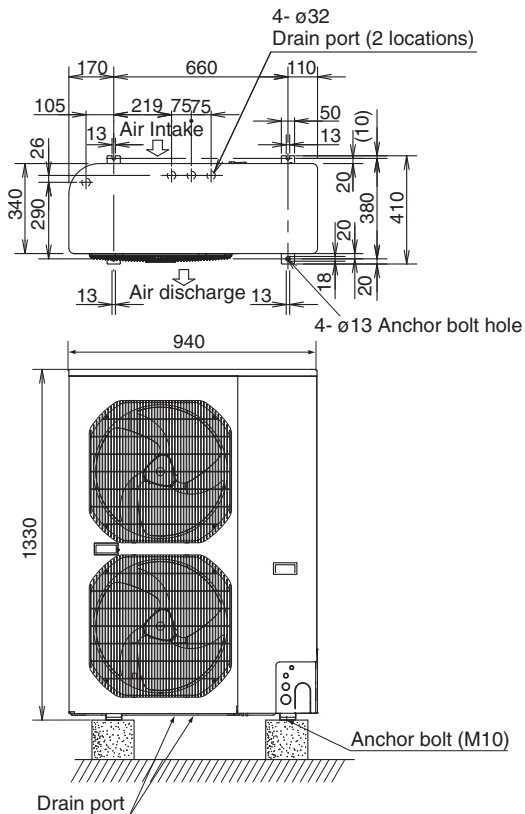


Fig. 3-1

3-2. Drainage Work

Follow the procedure below to ensure adequate draining for the outdoor unit.

- For the drain port dimensions, refer to Fig. 3-1.
- Ensure a base height of 15 cm or more at the feet on both sides of the unit.
- When using a drain pipe, install the drain socket (field supply) onto the drain port. Seal the other drain port with the rubber cap supplied with the drain socket.
- For details, refer to the instruction manual of the drain socket (field supply).
- After completing the installation work of the drain socket, make sure that the water does not leak from any part of connection.

3-3. Routing the Tubing and Wiring

- The tubing and wiring can be extended out in 4 directions (front, rear, right, and down):
 - The service valves are housed inside the unit. To access them, remove the inspection panel. (To remove the inspection panel, remove the 3 screws, then slide the panel downward and pull it toward you.)
- (1) If the routing direction is through the front, rear, or right, use a nipper or similar tool to cut out the knockout holes for the inter-unit control wiring outlet, power wiring outlet, and tubing outlet from the appropriate covers A and B. When routing the wiring, be sure to attach each supplied plastic bar to the edges around the wiring outlet holes in order to protect the wiring from scratches by the cutting burr.
 - (2) If the routing direction is down, use a nipper or similar tool to cut out the lower flange from cover A.

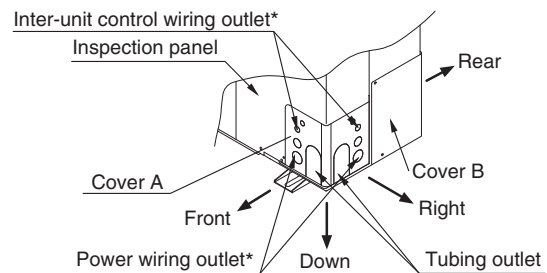


Fig. 3-2

NOTE

* When not using a conduit material or existing materials, measure and cut the supplied plastic bar according to the size of the wiring outlet hole. Then attach the plastic bar to the edges around the hole. Use sealing putty to seal off the hole to prevent the dust and insects from entering the wiring outlet holes.

CAUTION

- Route the tubing so that it does not contact the compressor, panel, or other parts inside the unit. Increased noise will result if the tubing contacts these parts.
- When routing the tubing, use a tube bender to bend the tubes.

4. ELECTRICAL WIRING

4-1. General Precautions on Wiring

- (1) Before wiring, confirm the rated voltage of the unit as shown on its nameplate, then carry out the wiring closely following the wiring diagram.
- (2) Provide a power outlet to be used exclusively for each unit and a power supply disconnect, circuit breaker and earth leakage breaker for overcurrent protection should be provided in the exclusive line.
- (3) To prevent possible hazards from insulation failure, the unit must be grounded.
- (4) Each wiring connection must be done in accordance with the wiring system diagram. Wrong wiring may cause the unit to disorder or become damaged.
- (5) Do not allow wiring to touch the refrigerant tubing, compressor, or any moving parts of the fan.
- (6) Unauthorized changes in the internal wiring can be very dangerous. The manufacturer will accept no responsibility for any damage or malfunction that occurs as a result of such unauthorized changes.
- (7) Regulations on wire diameters differ from locality to locality. For field wiring rules, please refer to your LOCAL ELECTRICAL CODES before beginning.
You must ensure that installation complies with all relevant rules and regulations.

(8) To prevent malfunction of the air conditioner caused by electrical noise, care must be taken when wiring as follows:

- The remote control wiring and the inter-unit control wiring should be wired apart from the inter-unit power wiring.
- Use shielded wires for inter-unit control wiring between units and ground the shield on both sides.

(9) If the power supply cord of this appliance is damaged, it must be replaced by a repair shop appointed by the manufacturer, because special purpose tools are required.

4-2. Recommended Wire Length and Wire Diameter for Power Supply System

Outdoor unit (Single-phase)

	(A) Power supply		Time delay capacity	
	Wire size	Max. length	Fuse	Circuit breaker
U-4LE1E5	4 mm ²	21 m	25 A	30 A
U-5LE1E5	6 mm ²	24 m	35 A	40 A
U-6LE1E5	6 mm ²	20 m	35 A	40 A

Outdoor unit (3-phase)

	(A) Power supply		Time delay capacity	
	Wire size	Max. length	Fuse	Circuit breaker
U-4LE1E8	2.5 mm ²	58 m	20 A	20 A
U-5LE1E8	2.5 mm ²	49 m	20 A	20 A
U-6LE1E8	2.5 mm ²	41 m	20 A	20 A

Indoor unit

Type	(B) Power supply	Time delay fuse or circuit capacity
	2.5 mm ²	
K1	Max. 150 m	10 – 16 A
D1, L1, U1, Y1, T1, F1, M1, P1, R1	Max. 130 m	10 – 16 A
E1 (73, 106, 140)	Max. 60 m	10 – 16 A

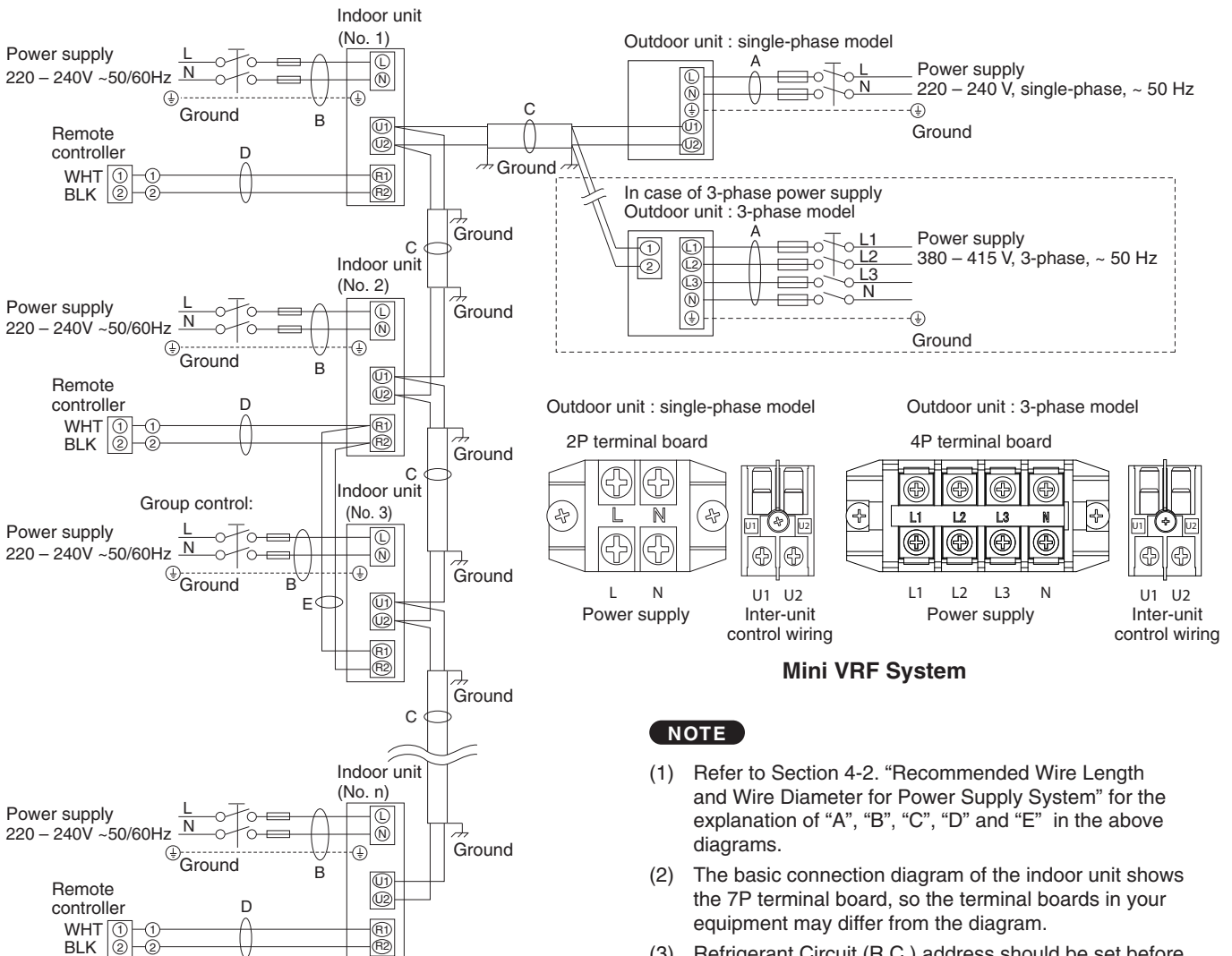
Control wiring

(C) Inter-unit (between outdoor and indoor units) control wiring	(D) Remote control wiring	(E) Control wiring for group control
0.75 mm ² (AWG #18) Use shielded wiring*1	0.75 mm ² (AWG #18)	0.75 mm ² (AWG #18)
Max. 1,000 m	Max. 500 m	Max. 200 m (Total)

NOTE

*1 With ring-type wire terminal.

4-3. Wiring System Diagrams



Mini VRF System

NOTE

- (1) Refer to Section 4-2. "Recommended Wire Length and Wire Diameter for Power Supply System" for the explanation of "A", "B", "C", "D" and "E" in the above diagrams.
- (2) The basic connection diagram of the indoor unit shows the 7P terminal board, so the terminal boards in your equipment may differ from the diagram.
- (3) Refrigerant Circuit (R.C.) address should be set before turning the power on.
- (4) Regarding the R.C. address setting, refer to Section 7-4. "Auto Address Setting". Address setting can be executed by remote controller automatically.

CAUTION

- When linking outdoor units in a network, disconnect the terminal extended from the short plug (CN-TERMINAL, 2P Black, location: right bottom on the outdoor main control PCB) from all outdoor units except any one of the outdoor units. (When shipping: In shorted condition)
For a system without link (no connection wiring between outdoor units), do not remove the short plug.
- Do not install the inter-unit control wiring in a way that forms a loop. (Fig. 4-1)

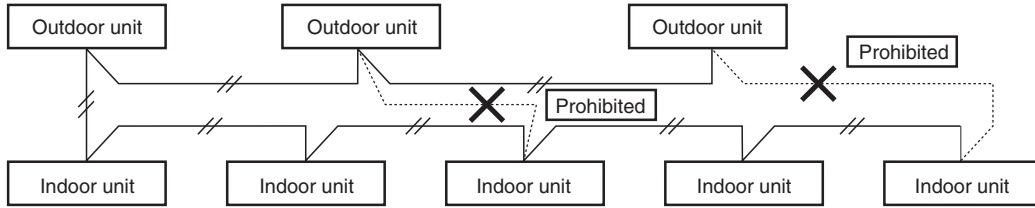


Fig. 4-1

- Do not install inter-unit control wiring such as star branch wiring. Star branch wiring causes mis-address setting.

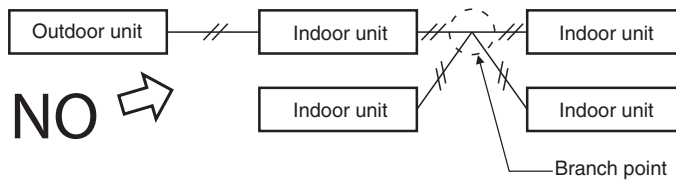


Fig. 4-2

- If branching the inter-unit control wiring, the number of branch points should be 16 or fewer. (Branches less than 1 m are not included in the total branch number.) (Fig. 4-3)

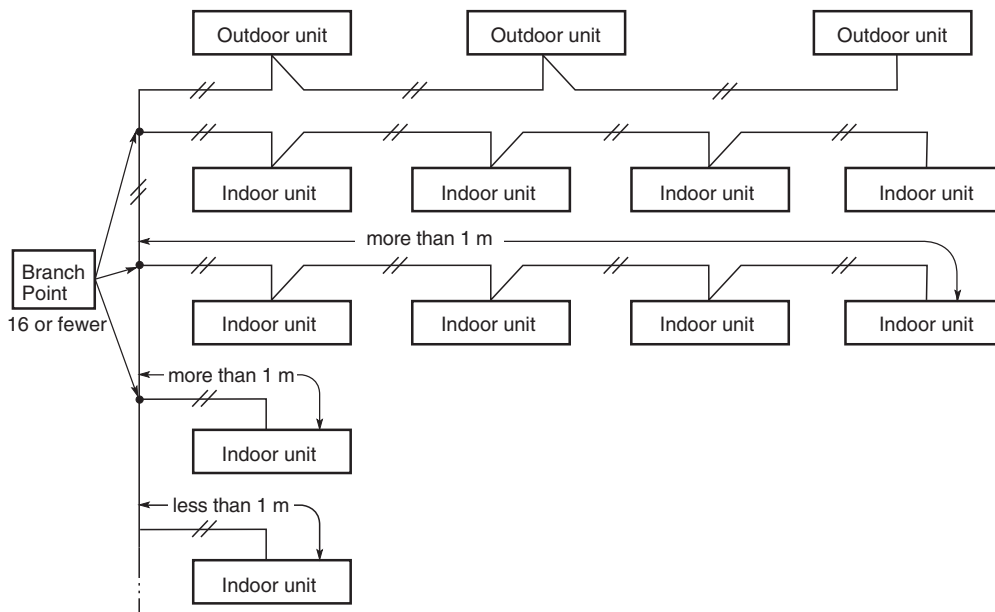


Fig. 4-3

- Use shielded wires for inter-unit control wiring (c) and ground the shield on both side, otherwise malfunction from noise may occur. (Fig. 4-4) Connect wiring as shown in Section “4-3. Wiring System Diagrams”.

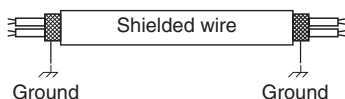


Fig. 4-4

WARNING

Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also occur. Therefore, ensure that all wiring is tightly connected.

When connecting each power wire to the terminal, follow the instructions on “How to connect wiring to the terminal” and fasten the wire securely with the fixing screw of the terminal plate.

- Use the standard power supply cables for Europe (such as H05RN-F or H07RN-F which conform to CENELEC (HAR) rating specifications) or use the cables based on IEC standard. (code designation, 60245 IEC 57, 60245 IEC 66)

How to connect wiring to the terminal

■ For stranded wiring

- (1) Cut the wire end with cutting pliers, then strip the insulation to expose the stranded wire about 10 mm and tightly twist the wire ends. (Fig. 4-5)

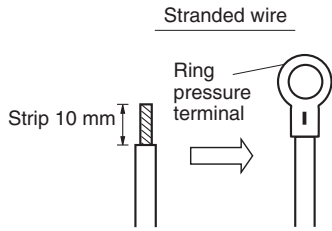


Fig. 4-5

- (2) Using a Phillips head screwdriver, remove the terminal screw(s) on the terminal plate.
- (3) Using a ring connector fastener or pliers, securely clamp each stripped wire end with a ring pressure terminal.
- (4) Place the ring pressure terminal, and replace and tighten the removed terminal screw using a screwdriver. (Fig. 4-6)

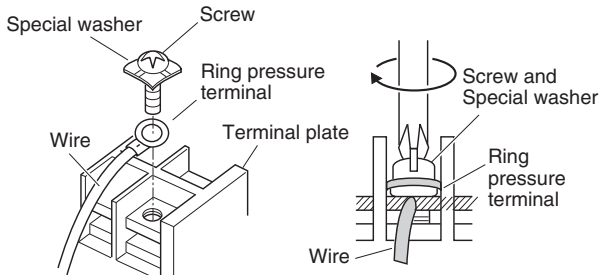


Fig. 4-6

■ Examples of shield wires

- (1) Remove cable coat not to scratch braided shield. (Fig. 4-7)
- (2) Unbraid the braided shield carefully and twist the unbraided shield wires tightly together. Insulate the shield wires by covering them with an insulation tube or wrapping insulation tape around them. (Fig. 4-8)
- (3) Remove coat of signal wire. (Fig. 4-9)
- (4) Attach ring pressure terminals to the signal wires and the shield wires insulated in Step (2). (Fig. 4-10)

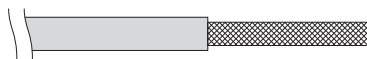


Fig. 4-7

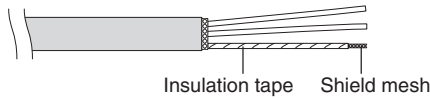


Fig. 4-8

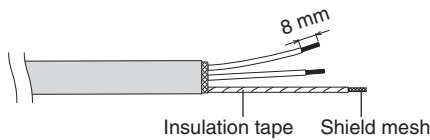


Fig. 4-9

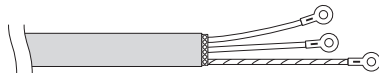
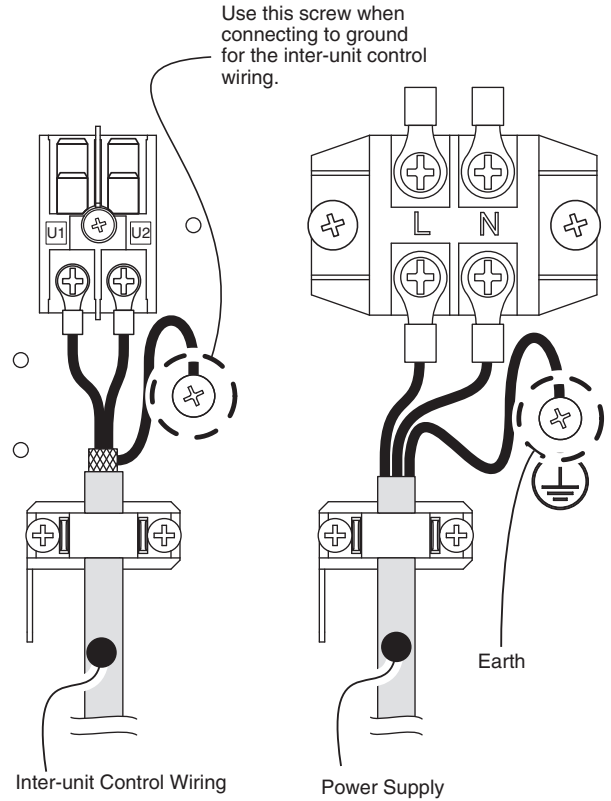


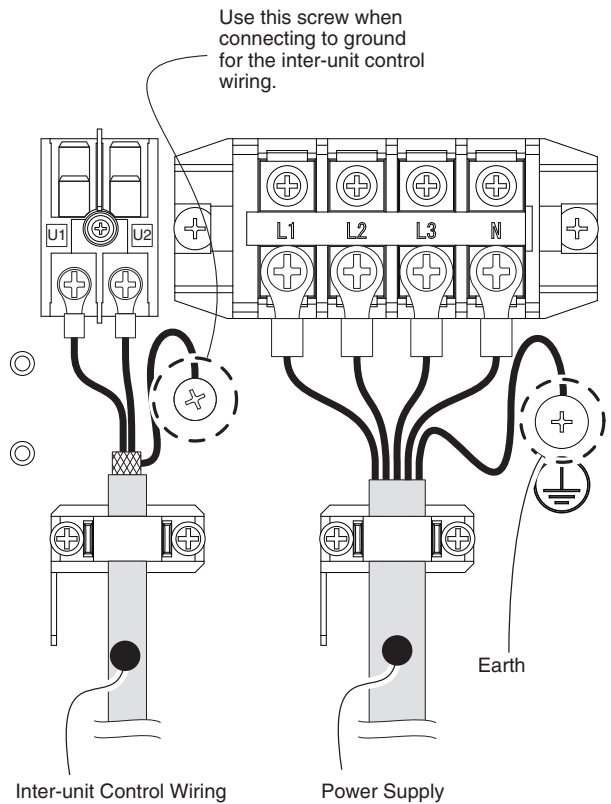
Fig. 4-10

■ Wiring sample

Outdoor unit : single-phase model



Outdoor unit : 3-phase model



5. HOW TO PROCESS TUBING

Both the liquid tubing and the gas tubing sides are connected by a flare nut.

5-1. Connecting the Refrigerant Tubing

Use of the Flaring Method

Many of conventional split system air conditioners employ the flaring method to connect refrigerant tubes which run between indoor and outdoor units. In this method, the copper tubes are flared at each end and connected with flare nuts.

Flaring Procedure with a Flare Tool

- (1) Cut the copper tube to the required length with a tube cutter. It is recommended to cut approx. 30 – 50 cm longer than the tubing length you estimate.
- (2) Remove burrs at the end of the copper tube with a tube reamer or file. This process is important and should be done carefully to make a good flare. (Fig. 5-1)

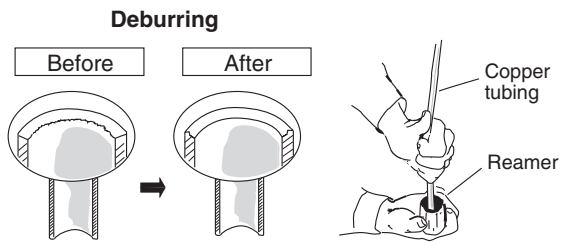


Fig. 5-1

Fig. 5-2

NOTE

When reaming, hold the tube end downward and be sure that no copper scraps fall into the tube. (Fig. 5-2)

- (3) Remove the flare nut from the unit and be sure to mount it on the copper tube.
- (4) Make a flare at the end of the copper tube with a flare tool. (Fig. 5-3)

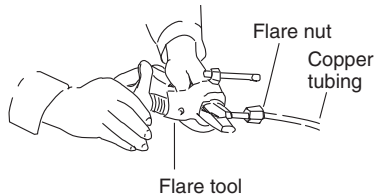


Fig. 5-3

NOTE

A good flare should have the following characteristics:

- inside surface is glossy and smooth
- edge is smooth
- tapered sides are of uniform length

Caution Before Connecting Tubes Tightly

- (1) Apply a sealing cap or water-proof tape to prevent dust or water from entering the tubes before they are used.
- (2) Be sure to apply refrigerant lubricant to the matching surfaces of the flare and union before connecting them together. This is effective for reducing gas leaks. (Fig. 5-4)

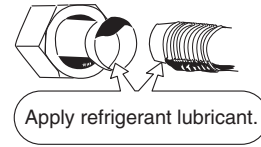


Fig. 5-4

- (3) For proper connection, align the union tube and flare tube straight with each other, then screw in the flare nut lightly at first to obtain a smooth match. (Fig. 5-5)

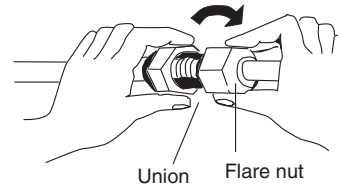


Fig. 5-5

- Adjust the shape of the liquid tube using a tube bender at the installation site and connect it to the liquid tubing side valve using a flare.

Cautions During Brazing

- Replace air inside the tube with nitrogen gas to prevent copper oxide film from forming during the brazing process. (Oxygen, carbon dioxide and Freon are not acceptable.)
- Do not allow the tubing to get too hot during brazing. The nitrogen gas inside the tubing may overheat, causing refrigerant system valves to become damaged. Therefore allow the tubing to cool when brazing.
- Use a reducing valve for the nitrogen cylinder.
- Do not use agents intended to prevent the formation of oxide film. These agents adversely affect the refrigerant and refrigerant oil, and may cause damage or malfunctions.

5-2. Connecting Tubing Between Indoor and Outdoor Units

- (1) Tightly connect the indoor-side refrigerant tubing extended from the wall with the outdoor-side tubing.
 - (2) To fasten the flare nuts, apply specified torque as shown in the table below.
- When removing the flare nuts from the tubing connections, or when tightening them after connecting the tubing, be sure to use 2 adjustable wrenches or spanners. (Fig. 5-6) If the flare nuts are over-tightened, the flare may be damaged, which could result in refrigerant leakage and cause injury or asphyxiation to room occupants.

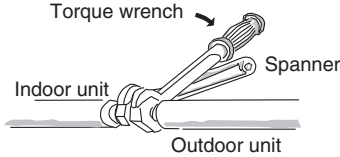


Fig. 5-6

- For the flare nuts at tubing connections, be sure to use the flare nuts that were supplied with the unit, or else flare nuts for R410A (type 2). The refrigerant tubing that is used must be of the correct wall thickness as shown in the table below.

Tube diameter	Tightening torque (approximate)	Tube thickness
ø6.35 (1/4")	14 – 18 N · m (140 – 180 kgf · cm)	0.8 mm
ø9.52 (3/8")	34 – 42 N · m (340 – 420 kgf · cm)	0.8 mm
ø12.7 (1/2")	49 – 55 N · m (490 – 550 kgf · cm)	0.8 mm
ø15.88 (5/8")	68 – 82 N · m (680 – 820 kgf · cm)	1.0 mm
ø19.05 (3/4")	100 – 120 N · m (1000 – 1200 kgf · cm)	1.2 mm

Because the pressure is approximately 1.6 times higher than conventional refrigerant pressure, the use of ordinary flare nuts (type 1) or thin-walled tubes may result in tube rupture, injury, or asphyxiation caused by refrigerant leakage.

- In order to prevent damage to the flare caused by over-tightening of the flare nuts, use the table on this page as a guide when tightening.
- When tightening the flare nut on the liquid tube, use an adjustable wrench with a nominal handle length of 200 mm.

5-3. Insulating the Refrigerant Tubing

Tubing Insulation

- **Standard Selection of Insulation Material**
Under the environment of the high temperature and high humidity, the surface of the insulation material is easy to become condensation. This will result in leakage and dew drop. Refer to the chart shown below when selecting the insulation material. In case that the ambient temperature and relative humidity are placed above the line of the insulation thickness, the condensation may occasionally make a dew drop on the surface of the insulation material. In this case, select the better insulation efficiency.

* However, since the condition will be different due to the sort of the insulation material and the environmental condition of the installation place, see the chart shown below as a reference when making a selection.

Standard Selection of Tubing Insulation

Calculating condition	
Sort of insulation material	Polyethylene heat resisting material
Thermal conductivity of insulation material	Based on JIS A9501
Calculating formula used when calculating thickness	Based on JIS A9501
Refrigerant temperature	2°C

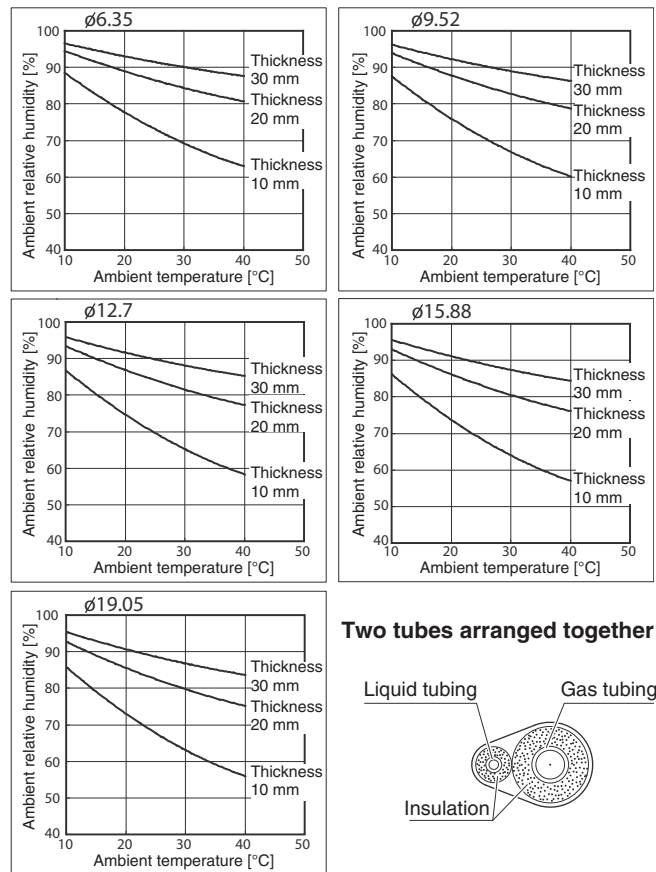


Fig. 5-7



If the exterior of the outdoor unit valves has been finished with a square duct covering, make sure you allow sufficient space to use the valves and to allow the panels to be attached and removed.

Taping the flare nuts

Wind the white insulation tape around the flare nuts at the gas tube connections. Then cover up the tubing connections with the flare insulator, and fill the gap at the union with the supplied black insulation tape. Finally, fasten the insulator at both ends with the supplied vinyl clamps. (Fig. 5-8)

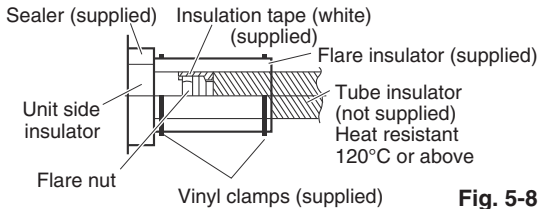


Fig. 5-8

Insulation material

The material used for insulation must have good insulation characteristics, be easy to use, be age resistant, and must not easily absorb moisture.



After a tube has been insulated, never try to bend it into a narrow curve because it can cause the tube to break or crack.

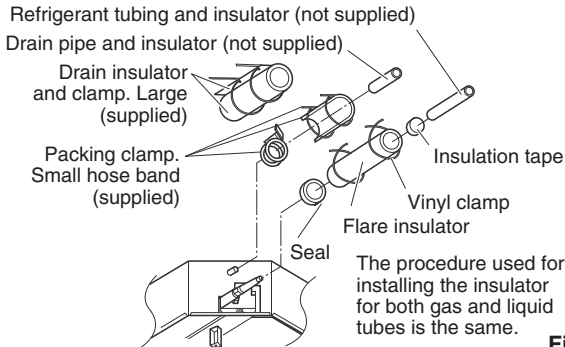


Fig. 5-9

Never grasp the drain or refrigerant connecting outlets when moving the unit.

5-4. Taping the Tubes

- (1) At this time, the refrigerant tubes (and electrical wiring if local codes permit) should be taped together with armoring tape in 1 bundle. To prevent condensation from overflowing the drain pan, keep the drain hose separate from the refrigerant tubing.
- (2) Wrap the armoring tape from the bottom of the outdoor unit to the top of the tubing where it enters the wall. As you wrap the tubing, overlap half of each previous tape turn.
- (3) Clamp the tubing bundle to the wall, using 1 clamp approx. each meter. (Fig. 5-10)

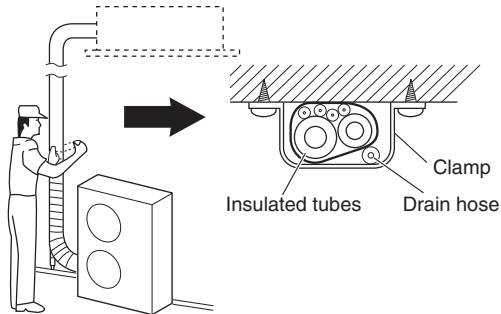


Fig. 5-10

NOTE

Do not wind the armoring tape too tightly since this will decrease the heat insulation effect. Also ensure that the condensation drain hose splits away from the bundle and drips clear of the unit and the tubing.

5-5. Finishing the Installation

After finishing insulating and taping over the tubing, use sealing putty to seal off the hole in the wall to prevent rain and draft from entering. (Fig. 5-11)

Apply putty here

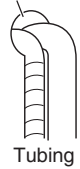


Fig. 5-11

6. AIR PURGING

Air and moisture in the refrigerant system may have undesirable effects as indicated below.

- pressure in the system rises
- operating current rises
- cooling (or heating) efficiency drops
- moisture in the refrigerant circuit may freeze and block capillary tubing
- water may lead to corrosion of parts in the refrigerant system

Therefore, the indoor unit and tubing between the indoor and outdoor unit must be leak tested and evacuated to remove any noncondensables and moisture from the system. (Figs. 6-1 and 6-2)

Manifold gauge

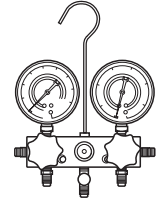


Fig. 6-1

Vacuum pump

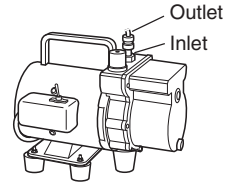


Fig. 6-2

■ Air Purging with a Vacuum Pump (for Test Run) Preparation

Check that each tube (both liquid and gas tubes) between the indoor and outdoor units has been properly connected and all wiring for the test run has been completed. Remove the valve caps from both the gas tube and liquid tube service valves on the outdoor unit. Note that both liquid and gas tube service valves on the outdoor unit are kept closed at this stage. (Fig. 6-3)

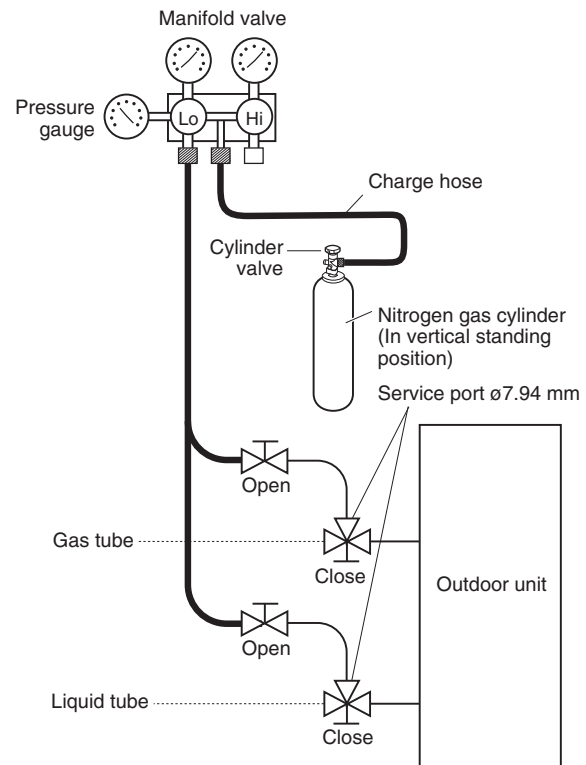


Fig. 6-3

Leak test

- Attach a manifold valve (with pressure gauges) and dry nitrogen gas cylinder to this service port with charge hoses.

CAUTION

Use a manifold valve for air purging. If it is not available, use a stop valve for this purpose. The “Hi” knob of the manifold valve must always be kept closed.

- Pressurize the system to no more than 3.80 MPa with dry nitrogen gas and close the cylinder valve when the gauge reading reaches 3.80 MPa. Then, test for leaks with liquid soap.

CAUTION

To avoid nitrogen entering the refrigerant system in a liquid state, the top of the cylinder must be higher than the bottom when you pressurize the system. Usually, the cylinder is used in a vertical standing position.

- Do a leak test of all joints of the tubing (both indoor and outdoor) and both gas tube and liquid tube service valves. Bubbles indicate a leak. Wipe off the soap with a clean cloth after the leak test.
- After the system is found to be free of leaks, relieve the nitrogen pressure by loosening the charge hose connector at the nitrogen cylinder. When the system pressure is reduced to normal, disconnect the hose from the cylinder.

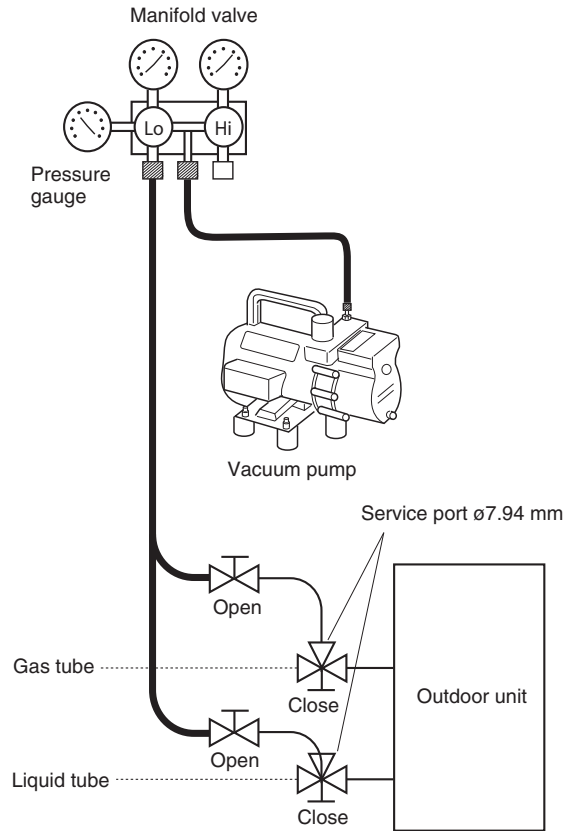


Fig. 6-4

Evacuation

- Attach the charge hose end described in the preceding steps to the vacuum pump to evacuate the tubing and indoor unit. Confirm that the “Lo” knob of the manifold valve is open. Then, run the vacuum pump. The operation time for evacuation varies with the tubing length and capacity of the pump. The following table shows the amount of time for evacuation:

Required time for evacuation when 30 gal/h vacuum pump is used	
If tubing length is less than 15 m	If tubing length is longer than 15 m
45 min. or more	90 min. or more

NOTE

The required time in the above table is calculated based on the assumption that the ideal (or target) vacuum condition is less than -101 kPa (-755 mmHg, 5 Torr).

- When the desired vacuum is reached, close the “Lo” knob of the manifold valve and turn off the vacuum pump. Confirm that the gauge pressure is under -101 kPa (-755 mmHg, 5 Torr) after 4 to 5 minutes of vacuum pump operation. (Fig. 6-4)

CAUTION

Use a cylinder designed for use with R410A respectively.

Charging additional refrigerant

- Charging additional refrigerant (calculated from the liquid tube length as shown in Section 1-7 “Additional Refrigerant Charge”) using the liquid tube service valve. (Fig. 6-5)
- Use a balance to measure the refrigerant accurately.
- If the additional refrigerant charge amount cannot be charged at once, charge the remaining refrigerant in liquid form by using the gas tube service valve with the system in cooling operation mode at the time of test run. (Fig. 6-6)

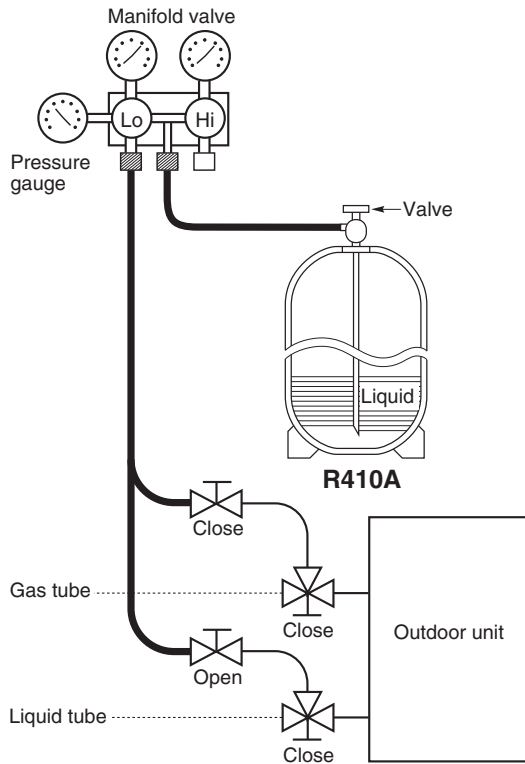


Fig. 6-5

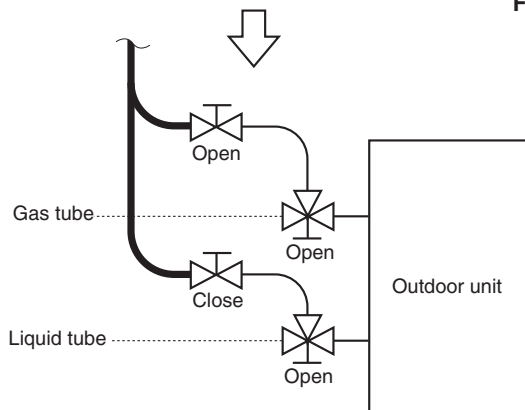


Fig. 6-6

Finishing the job

- (1) With a hex wrench, turn the liquid tube service valve stem counterclockwise to fully open the valve.
- (2) Turn the gas tube service valve stem counterclockwise to fully open the valve.



To avoid gas from leaking when removing the charge hose, make sure the stem of the gas tube is turned all the way out.

- (3) Loosen the charge hose connected to the gas tube service port (for $\varnothing 7.94$ mm tube) slightly to release the pressure, then remove the hose.
- (4) Replace the service port cap on the gas tube service port and fasten the cap securely with an adjustable wrench or box wrench. This process is very important to prevent gas from leaking from the system.
- (5) Replace the valve caps at both gas tube and liquid tube service valves and fasten them securely.

This completes air purging with a vacuum pump. The air conditioner is now ready for a test run. Refer to Section "7. TEST RUN".

7. TEST RUN

7-1. Preparing for Test Run

● Before attempting to start the air conditioner, check the following points.

- (1) All loose matter is removed from the cabinet especially steel filings, bits of wire, and clips.
- (2) The control wiring is correctly connected and all electrical connections are tight.
- (3) The transportation pads for the indoor fan have been removed. If not, remove them now.
- (4) The power has been supplied to the unit for at least 5 hours before starting the compressor. The bottom of the compressor should be warm to the touch and the crankcase heater around the feet of the compressor should be hot to the touch. (Fig. 7-1)

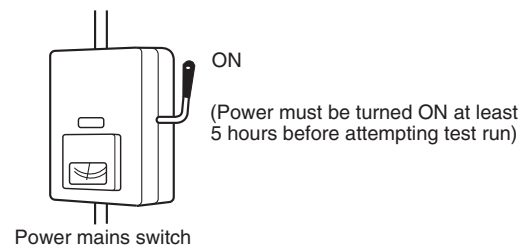


Fig. 7-1

- (5) Both the gas and liquid tube service valves are open. If not, open them now. (Fig. 7-2)

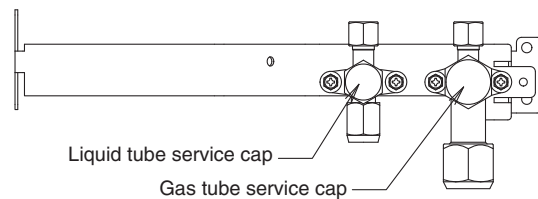


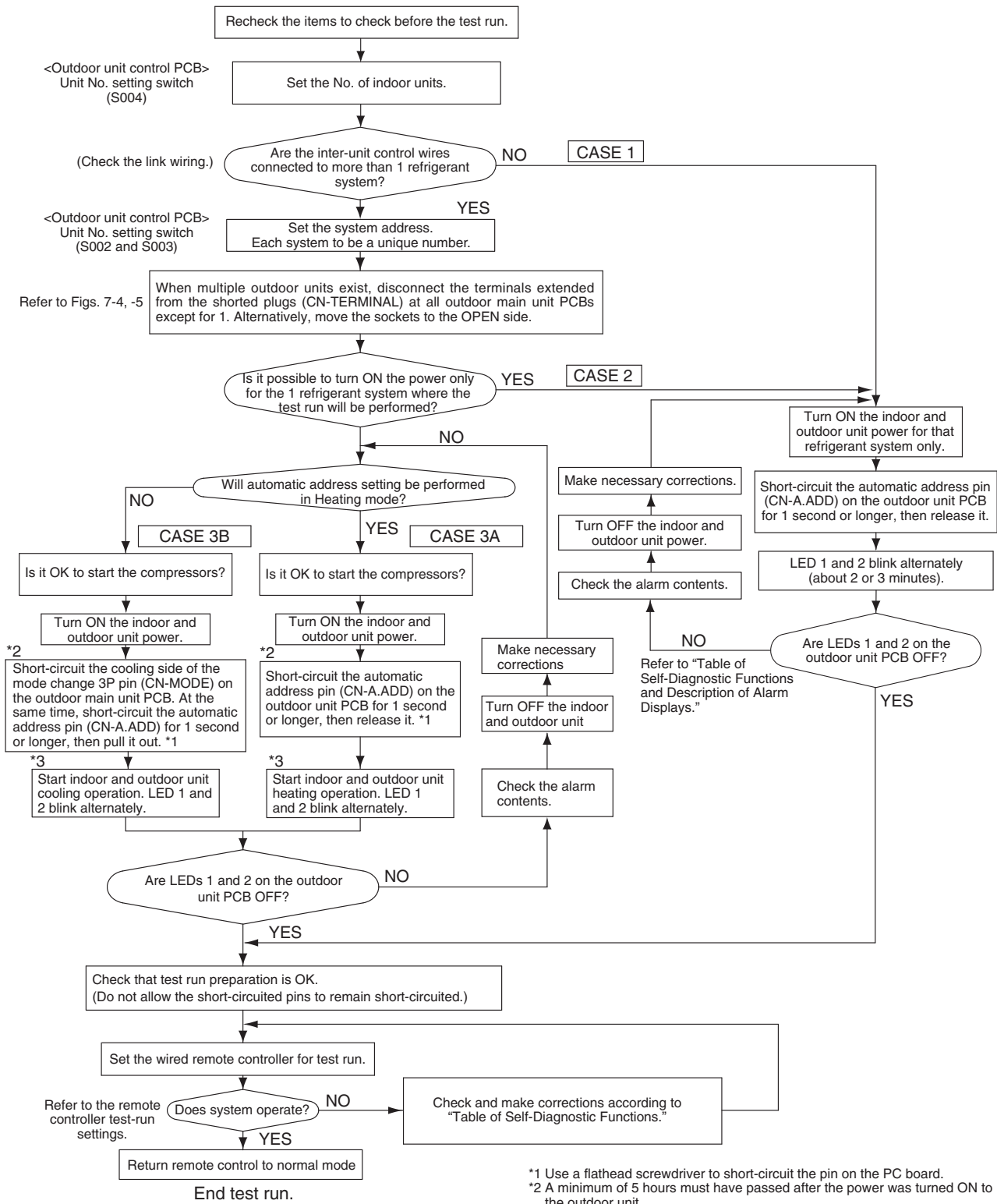
Fig. 7-2

- (6) Request that the customer be present for the test run. Explain the contents of the instruction manual, and then have the customer actually operate the system.
- (7) Be sure to give the instruction manual and warranty certificate to the customer.
- (8) When replacing the control PCB, be sure to make all the same settings on the new PCB as were in use before replacement. The existing EEPROM is not changed, and is connected to the new control PCB.

7-2. Test Run Procedure

Items to Check Before the Test Run

1. Turn the remote power switch on at least 5 hours before the test, in order to energize the crankcase heater.
 2. Turn the outdoor service valves (2 locations) to the full-open positions.
- Use caution when making the settings.
If there are duplicated system addresses, or if the settings for the Nos. of the indoor units are not consistent, an alarm will occur and the system will not start.
 - These settings are not made on the indoor unit PCB.

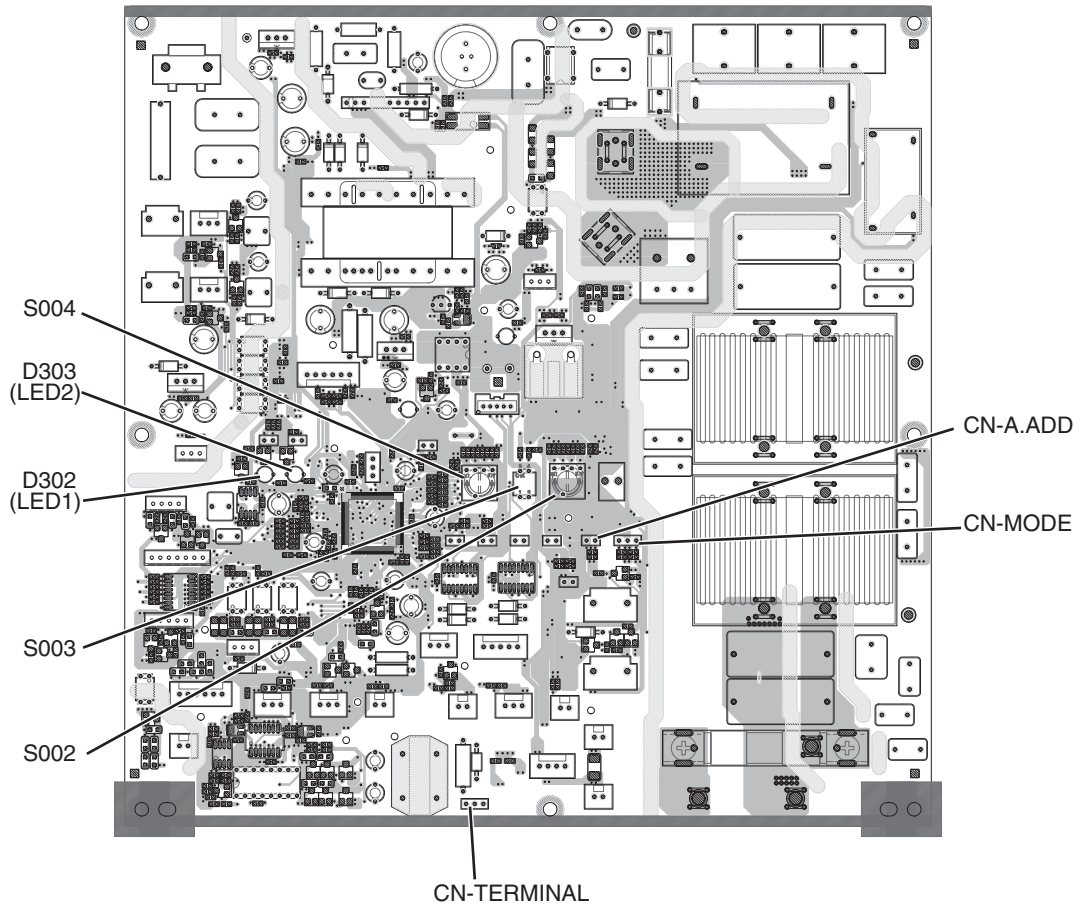


*1 Use a flathead screwdriver to short-circuit the pin on the PC board.
*2 A minimum of 5 hours must have passed after the power was turned ON to the outdoor unit.
*3 All indoor units operate in all refrigerant systems where the power is ON.

Fig. 7-3

7-3. Outdoor Unit PCB Setting

(for single-phase outdoor unit PCB)



(for 3-phase outdoor unit PCB)

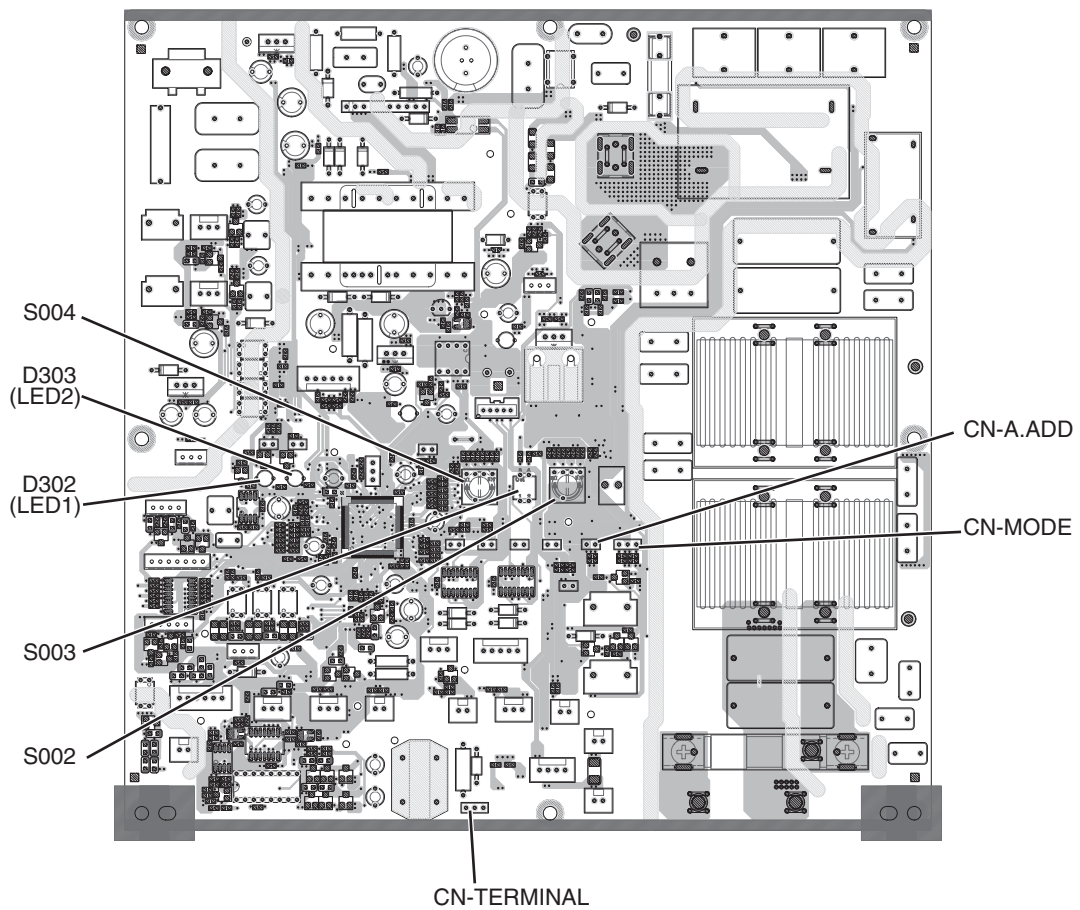













Fig. 7-4

● **Examples of the No. of indoor units settings**

No. of indoor units	Indoor unit setting (S004) (Rotary switch, gray)
1 unit (factory setting)	 set to 1
2 units	 set to 2
}	}
9 units	 set to 9

● **Examples of refrigerant circuit (R.C.) address settings (required when link wiring is used)**

System address No.	System address (S003) (2P DIP switch, black)	System address (S002) (Rotary switch, yellow)
System 1 (factory setting)	Both OFF  ON ↑ OFF ↓	 set to 1
System 11	1 ON  ON ↑ OFF ↓	 set to 1
System 21	2 ON  ON ↑ OFF ↓	 set to 1
System 30	1&2 ON  ON ↑ OFF ↓	 set to 0

7-4. Auto Address Setting

Basic wiring diagram: Example (1)

• **If link wiring is not used**
(The inter-unit control wires are not connected to multiple refrigerant systems.)

Indoor unit addresses can be set without operating the compressors.

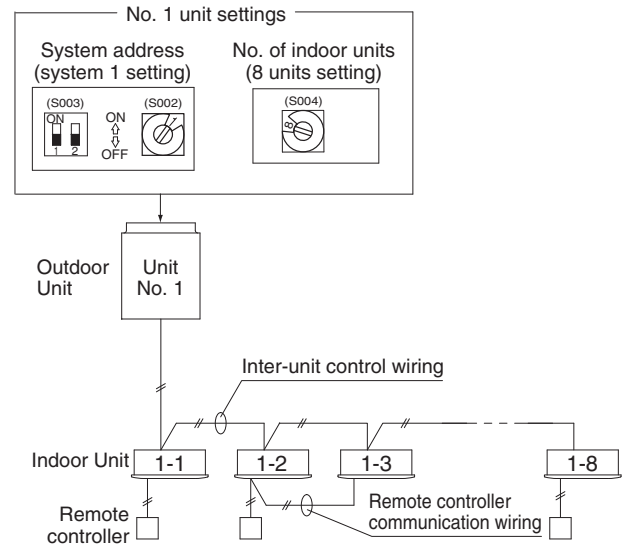


Fig. 7-6

(1) Automatic Address Setting from the Outdoor Unit

- 1 On the outdoor unit control PCB, check that the system address rotary switch (S002) is set to "1" and that the DIP switch (S003) is set to "0".



(These are the settings at the time of factory shipment.)

- 2 To set the number of indoor units that are connected to the outdoor unit to 8 on the outdoor unit control PCB, set the No. of indoor units rotary switch (S004) to "8".
- 3 Turn ON the power to the indoor and outdoor units.
- 4 On the outdoor unit control PCB, short-circuit the automatic address pin (CN-A.ADD) for 1 second or longer, then release it.

↓
(Communication for automatic address setting begins.)

↓
* To cancel, again short-circuit the automatic address pin (CN-A.ADD) for 1 second or longer, then pull it out.
The LED that indicates that automatic address setting is in progress turns OFF and the process is stopped.

(Automatic address setting is completed when LEDs 1 and 2 on the outdoor unit control PCB turn OFF.)

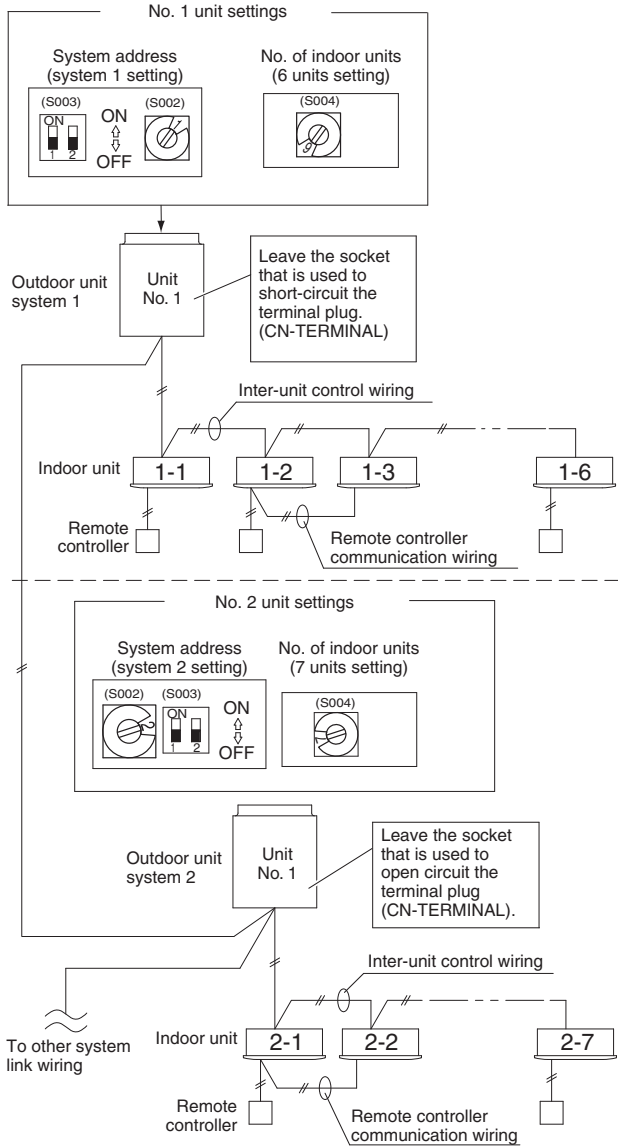
- 5 Operation from the remote controllers is now possible.

* To perform automatic address setting from the remote controller, perform steps 1 to 3, then use the remote controller and complete automatic address setting. Refer to "Automatic Address Setting from the Remote Controller."

Basic wiring diagram: Example (2)

• If link wiring is used

* When multiple outdoor units exist, remove the socket that is used to short-circuit the terminal plug (CN-TERMINAL) from all outdoor unit PCBs except for 1. Alternatively, move the sockets to the "OPEN" side.



Make settings as appropriate for the cases listed below.

Indoor and outdoor unit power can be turned ON for each system separately. → **<Case 2>**

Indoor and outdoor unit power cannot be turned ON for each system separately.

Automatic address setting in Heating mode → **<Case 3A>**

Automatic address setting in Cooling mode → **<Case 3B>**

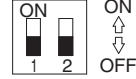
Fig. 7-7

<Case 2> Automatic Address Setting (no compressor operation)

- Indoor and outdoor unit power can be turned ON for each system separately. Indoor unit addresses can be set without operating the compressors.

Automatic Address Setting from Outdoor Unit

- 1 On the outdoor unit control PCB, check that the system address rotary switch (S002) is set to "1" and that the DIP switch (S003) is set to "0".



(These are the settings at the time of factory shipment.)

- 2 To set the number of indoor units that are connected to the outdoor unit to 6 on the outdoor unit control PCB, set the No. of indoor units rotary switch (S004) to "6".
- 3 At the outdoor unit where all indoor and outdoor unit power has been turned ON, short-circuit the automatic address pin (CN-A.ADD) for 1 second or longer, then pull it out.

(Communication for automatic address setting begins.)

* To cancel, again short-circuit the automatic address pin (CN-A.ADD) for 1 second or longer, then pull it out. The LED that indicates automatic address setting is in progress turns OFF and the process is stopped.

(Automatic address setting is completed when LEDs 1 and 2 on the outdoor unit control PCB turn OFF.)

- 4 Next turn the power ON only for the indoor and outdoor units of the next (different) system. Repeat steps 1 – 3 in the same way to complete automatic address settings for all systems.

- 5 Operation from the remote controllers is now possible. * To perform automatic address setting from the remote controller, perform steps 1 and 2, then use the remote controller complete automatic address setting. Refer to "Automatic Address Setting from the Remote Controller."

<Case 3A> Automatic Address Setting in Heating Mode

- Indoor and outdoor unit power cannot be turned ON for each system separately.
In the following, automatic setting of indoor unit addresses is not possible if the compressors are not operating. Therefore perform this process only after completing all refrigerant tubing work.

Automatic Address Setting from Outdoor Unit

- 1 Perform steps 1 and 2 in the same way as for <Case 2> .
- 2 Turn the indoor and outdoor unit power ON at all systems.
↓
- 3 To perform automatic address setting in <Heating mode>, on the outdoor unit control PCB in the refrigerant system where you wish to set the addresses, short-circuit the automatic address pin (CN-A.ADD) for 1 second or longer, then pull it out.
(Be sure to perform this process for one system at a time. Automatic address settings cannot be performed for more than one system at the same time.)
↓
(Communication for automatic address setting begins, **the compressors turn ON, and automatic address setting in heating mode begins.**)
(All indoor units operate.)
↓
* To cancel, again short-circuit the automatic address pin (CN-A.ADD) for 1 second or longer, then pull it out.
The LED that indicates automatic address setting is in progress turns OFF and the process is stopped.

(Automatic address setting is completed when the compressors stop and LEDs 1 and 2 on the outdoor unit control PCB turn OFF.)
↓
- 4 At the outdoor unit in the next (different) system, short-circuit the automatic address pin (CN-A.ADD) for 1 second or longer, then pull it out.
↓
(Repeat the same steps to complete automatic address setting for all units.)
↓
- 5 Operation from the remote controllers is now possible.

* To perform automatic address setting from the remote controller, perform steps 1 and 2, then use the remote controller complete automatic address setting. Refer to "Automatic Address Setting from the Remote Controller."

<Case 3B> Automatic Address Setting in Cooling Mode

- Indoor and outdoor unit power cannot be turned ON for each system separately.
In the following, automatic setting of indoor unit addresses is not possible if the compressors are not operating. Therefore perform this process only after completing all refrigerant tubing work.
Automatic address setting can be performed during Cooling operation.

Automatic Address Setting from Outdoor Unit

- 1 Perform steps 1 and 2 in the same way as for <Case 2> .
- 2 Turn the indoor and outdoor unit power ON at all systems.
↓
- 3 To perform automatic address setting in <Cooling mode>, on the outdoor unit control PCB in the refrigerant system where you wish to set the addresses, short-circuit the cooling side of the mode change 3P pin (CN-MODE). At the same time, short-circuit the automatic address pin (CN-A.ADD) for 1 second or longer, then pull it out. (Be sure to perform this process for one system at a time. Automatic address settings cannot be performed for more than one system at the same time.)
↓
(Communication for automatic address setting begins, **the compressors turn ON, and automatic address setting in Cooling mode begins.**)
(All indoor units operate.)
↓
* To cancel, again short-circuit the automatic address pin (CN-A.ADD) for 1 second or longer, then pull it out.
The LED that indicates automatic address setting is in progress turns OFF and the process is stopped.

(Automatic address setting is completed when the compressors stop and LEDs 1 and 2 on the outdoor unit control PCB turn OFF.)
↓
- 4 At the outdoor unit in the next (different) system, short-circuit the automatic address pin (CN-A.ADD) for 1 second or longer, then pull it out.
↓
(Repeat the same steps to complete automatic address setting for all units.)
↓
- 5 Operation from the remote controllers is now possible.

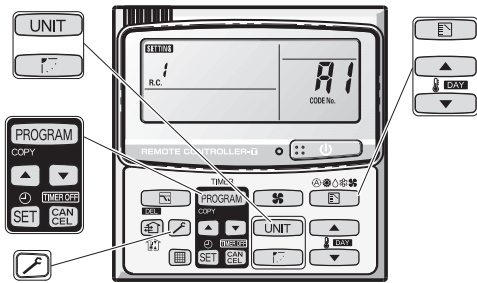
* Automatic address setting in Cooling mode cannot be done from the remote controller.

Automatic Address Setting from the Remote Controller*

Selecting each refrigerant system individually for automatic address setting

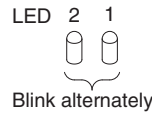
---Automatic address setting for each system: Item code "A1"

- Press the remote controller timer time button and button at the same time. (Press and hold for 4 seconds or longer.)
- Next, press either the temperature setting or button.
(Check that the item code is "A1.")
- Use either the or button to set the system No. to perform automatic address setting.
- Then press the button.
(Automatic address setting for one refrigerant system begins.)
(When automatic address setting for one system is completed, the system returns to normal stopped status.)
<Approximately 4 – 5 minutes is required.>
(During automatic address setting, "SETTING" is displayed on the remote controller. This message disappears when automatic address setting is completed.)
- Repeat the same steps to perform automatic address setting for each successive system.



Display during automatic address setting

- On outdoor unit PCB



- * Do not short-circuit the automatic address setting pin (CN-A.ADD) again while automatic address setting is in progress. Doing so will cancel the setting operation and will cause LEDs 1 and 2 to turn OFF.
- * When automatic address setting has been successfully completed, both LEDs 1 and 2 turn OFF.
- * LED 1 is D302. LED 2 is D303.
- * If automatic address setting is not completed successfully, refer to the table below and correct the problem. Then perform automatic address setting again.

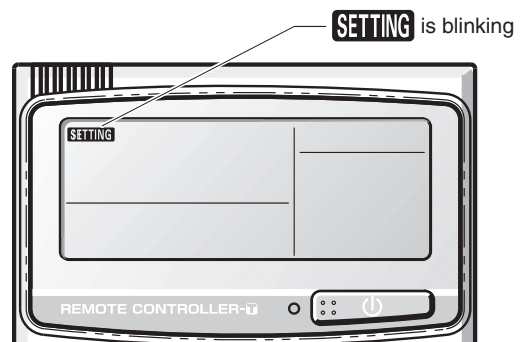
- Display details of LEDs 1 and 2 on the outdoor unit control PCB

(☀ : ON ☀ : Blinking ● : OFF)

LED 1	LED 2	Display meaning
☀	☀	After the power is turned ON (and automatic address setting is not in progress), no communication with the indoor units in that system is possible.
●	☀	After the power is turned ON (and automatic address setting is not in progress), 1 or more indoor units are confirmed in that system; however, the number of indoor units does not match the number that was set.
☀	☀	Alternating Automatic address setting is in progress.
●	●	Automatic address setting completed.
☀	☀	Simultaneous At time of automatic address setting, the number of indoor units did not match the number that was set. ⚠(when indoor units are operating) indication appears on the display.
☀	☀	Alternating Refer to Table of Self-Diagnostic Functions and Description of Alarm Displays.

Note: ⚠ indicates that the solenoid is fused or that there is a CT (current detection circuit) failure (current is detected when the compressor is OFF).

- Remote controller display during automatic setting



Request concerning recording the indoor/outdoor unit combination Nos.

After automatic address setting has been completed, be sure to record them for future reference.

List the outdoor unit system address and the addresses of the indoor units in that system in an easily visible location (next to the nameplate), using a permanent marking pen or similar means that cannot be erased easily.




Example: (Outdoor) 1 – (Indoor) 1-1, 1-2, 1-3...
(Outdoor) 2 – (Indoor) 2-1, 2-2, 2-3...

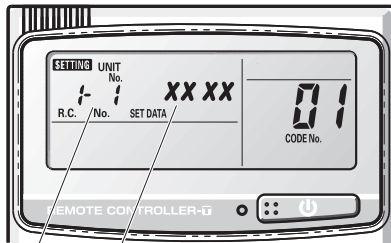
These numbers are necessary for later maintenance. Please be sure to indicate them.

Checking the indoor unit addresses

Use the remote controller to check the indoor unit address.

<If 1 indoor unit is connected to 1 remote controller>






- 1 Press and hold the  button and  button for 4 seconds or longer (simple settings mode).
- 2 The address is displayed for the indoor unit that is connected to the remote controller. (Only the address of the indoor unit that is connected to the remote controller can be checked.)
- 3 Press the  button again to return to normal remote controller mode.

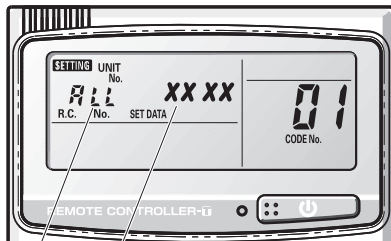


Number changes to indicate which indoor unit is currently selected.

Indoor unit address

<If multiple indoor units are connected to 1 remote controller (group control)>



- 1 Press and hold the  button and  button for 4 seconds or longer (simple settings mode).
- 2 "ALL" is displayed on the remote controller.
- 3 Next, press the  button.
- 4 The address is displayed for 1 of the indoor units which is connected to the remote controller. Check that the fan of that indoor unit starts and that air is discharged.
- 5 Press the  button again and check the address of each indoor unit in sequence.
- 6 Press the  button again to return to normal remote controller mode.




Number changes to indicate which indoor unit is currently selected.

Indoor unit address

Remote Controller Test Run Settings

- 1 Press the remote controller  button for 4 seconds or longer. Then press the  button.
 - "TEST" appears on the LCD display while the test run is in progress.
 - The temperature cannot be adjusted when in Test Run mode. (This mode places a heavy load on the machines. Therefore use it only when performing the test run.)
- 2 The test run can be performed using the HEAT, COOL, or FAN operation modes.

Note: The outdoor units will not operate for approximately 3 minutes after the power is turned ON and after operation is stopped.
- 3 If correct operation is not possible, a code is displayed on the remote controller display. (Refer to "7-6. Meaning of Alarm Messages" and correct the problem.)
- 4 After the test run is completed, press the  button again. Check that "TEST" disappears from the remote controller display. (To prevent continuous test runs, this remote controller includes a timer function that cancels the test run after 60 minutes.)

* If the test run is performed using the wired remote controller, operation is possible even if the cassette-type ceiling panel has not been installed. ("P09" display does not occur.)

7-5. Caution for Pump Down

Pump down means refrigerant gas in the system is returned to the outdoor unit. Pump down is used when the unit is to be moved, or before servicing the refrigerant circuit.



- This outdoor unit cannot collect more than the rated refrigerant amount as shown by the nameplate on the back.
- If the amount of refrigerant is more than that recommended, do not conduct pump down. In this case, use another refrigerant collecting system.

7-6. Meaning of Alarm Messages

Table of Self-Diagnostics Functions and Description of Alarm Displays

Alarm messages are indicated by the blinking of LED 1 and 2 (D302, D303) on the outdoor unit PCB. They are also displayed on the wired remote controller.

- Viewing the LED 1 and 2 (D302 and D303) alarm displays

LED 1	LED 2	Alarm contents
☼	☼	Alarm display LED 1 blinks M times, then LED 2 blinks N times. The cycle then repeats. M = 2: P alarm 3: H alarm 4: E alarm 5: F alarm 6: L alarm N = Alarm No. Example: LED 1 blinks 2 times, then LED 2 blinks 17 times. The cycle then repeats. Alarm is "P17".
Alternating		

(☼: Blinking)

Possible cause of malfunction			Alarm message
Serial communication errors/Mis-setting	Remote controller is detecting error signal from indoor unit.	Error in receiving serial communication signal. (Signal from main indoor unit in case of group control) Ex: Auto address is not completed.	<E01>
		Error in transmitting serial communication signal.	<E02>
	Indoor unit is detecting error signal from remote controller (and system controller).		<<E03>>
	Indoor unit is detecting error signal from main outdoor unit.	Error in receiving serial communication signal. When turning on the power supply, the number of connected indoor units does not correspond to the number set. (Except R.C. address is "0".)	E04
		Error of the outdoor unit in receiving serial communication signal from the indoor unit.	<E06>
	Improper setting of indoor unit or remote controller.	Indoor unit address setting is duplicated.	E08
		Remote controller address connector (RCU, ADR) is duplicated. (Duplication of main remote controller)	<<E09>>
	During auto address setting, number of connected units does not correspond to number set.	Starting auto address setting is prohibited. This alarm message shows that the auto address connector CN-A.ADD is shorted while other RC line is executing auto address operation.	E12
		Error in auto address setting. (Number of connected indoor units is less than the number set)	E15
	When turning on the power supply, number of connected units does not correspond to number set. (Except R.C. address is "0".)	Error in auto address setting. (Number of connected indoor units is more than the number set)	E16
		No indoor unit is connected during auto address setting.	E20
		Main outdoor unit is detecting error signal from sub outdoor unit.	E24
		Error of outdoor unit address setting.	E25
		The number of connected main and sub outdoor units do not correspond to the number set at main outdoor unit PCB.	E26
		Error of sub outdoor unit in receiving serial communication signal from main outdoor unit.	E29
		Indoor unit communication error of group control wiring.	Error of main indoor unit in receiving serial communication signal from sub indoor units.

Possible cause of malfunction			Alarm message	
Serial communication errors/Mis-setting	Improper setting.	This alarm message shows when the indoor unit for multiple-use is not connected to the outdoor unit.	L02	
		Duplication of main indoor unit address setting in group control.	<L03>	
		Duplication of outdoor R.C. address setting.	L04	
		There are 2 or more indoor units controllers which have operation mode priority in 1 refrigerant circuit.	Priority set remote controller	L05
			Non-priority set remote controller	L06
		Group control wiring is connected to individual control indoor unit.	L07	
		Indoor unit address is not set.	L08	
		Capacity code of indoor unit is not set.	<<L09>>	
		Capacity code of outdoor unit is not set.	L10	
		Mis-matched connection of outdoor units which have different kinds of refrigerant.	L17	
4-way valve operation failure	L18			
Activation of protective device	Protective device in outdoor unit is activated.	Thermal protector in indoor unit fan motor is activated.	<<P01>>	
		Improper wiring connections of ceiling panel.	<<P09>>	
		Float switch is activated.	<<P10>>	
		Operation of protective function of fan inverter	<<P12>>	
		Compressor thermal protector is activated. Power supply voltage is unusual. (The voltage is more than 260 V or less than 160 V between L and N phase.)	P02	
	Protective device in outdoor unit is activated.	Incorrect discharge temperature. (Comp. No. 1)	P03	
		Power supply circuit failure, missing-phase detection.	P05	
		Forgot to open service valve	P13	
		O ₂ sensor (detects low oxygen level) activated.	P14	
		Compressor running failure resulting from missing phase in the compressor wiring, etc. (Start failure not caused by IPM or no gas.)	P16	
		Outdoor unit fan motor is unusual.	P22	
		IPM trip (IPM current or temperature)	H31	
		Missing-phase/reverse-phase in the compressor wiring, Compressor start-up failure (Overcurrent at time of INV compressor starts up, etc.)	P29	

continued





Possible cause of malfunction			Alarm message
Thermistor fault	Indoor thermistor is either open or damaged.	Indoor coil temp. sensor (E1)	<<F01>>
		Indoor coil temp. sensor (E2)	<<F02>>
		Indoor coil temp. sensor (E3)	<<F03>>
		Indoor suction air (room) temp. sensor (TA)	<<F10>>
		Indoor discharge air temp. sensor (BL)	<<F11>>
	Outdoor thermistor is either open or damaged.	Compressor No. 1 discharge gas temp. sensor (TD)	F04
		Outdoor No. 1 coil gas temp. sensor (EXG1)	F06
		Outdoor No. 1 coil liquid temp. sensor (C1)	F07
		Outdoor air temp. sensor (TO)	F08
		Compressor intake port temperature sensor (TS)	F12
High pressure sensor failure		F16	
Low pressure sensor failure		F17	
EEPROM on indoor unit PCB failure			F29
Protective device for compressor is activated	Protective device for compressor No. 1 is activated.	EEPROM on the outdoor unit PCB is a failure.	F31
		Overcurrent of power supply current (CT) sensor	H01
		PAM failure	H02
		Power supply current (CT) sensor failure (Current is not detected at time of compressor ON.)	H03
		Discharge gas temperature of the comp. No. 1 is not detected. Temp. sensor is not seated at the sensor holder.	H05
		Low pressure switch is activated.	H06
	Low oil level.	H07	
	Oil sensor fault. (Disconnection, etc)	Comp. No. 1 oil sensor	H08
Alarm messages displayed on system controller			
Serial communication errors/ Mis-setting	Error in transmitting serial communication signal	Indoor or main outdoor unit is not operating correctly. Mis-wiring of control wiring between indoor unit, main outdoor unit and system controller.	C05
	Error in receiving serial communication signal	Indoor or main outdoor unit is not operating correctly. Mis-wiring of control wiring between indoor unit, main outdoor unit and system controller. CN1 is not connected properly.	C06
Activation of protective device	Protective device of sub indoor unit in group control is activated.	When using wireless remote controller or system controller, in order to check the alarm message in detail, connect wired remote controller to indoor unit temporarily.	P30

NOTE

- Alarm messages in << >> do not affect other indoor unit operations.
- Alarm messages in < > sometimes affect other indoor unit operations depending on the fault.

8. MARKINGS FOR DIRECTIVE 97/23/EC (PED)

Rating nameplate figure

Panasonic					
Multi Type Air Conditioner Кондиционер Мульти-Сплит Система		Model No.	A : Model Name Various		
Класс заштити					
POWER SOURCE : B : Various					
MAX ELECTRIC INPUT C : kW A : Various					
TIME DELAY FUSE MAX SIZE : D : A - - - - - Various					
UNIT PROTECTION : IPX4					
Operating Spec. Area Various (Not for the PED)					
MAX. WORKING PRESSURE : HIGH SIDE E : MPa Various					
LOW SIDE F : MPa Various					
REFRIGERANT : R410A G : kg Various					
NET WEIGHT : Various (Not for the PED)					
SERIAL NO. : [Various]		PROD. DATE : MM-YYYY			
Серийный номер. : - - - - -		Дата производства : MM-YYYY			
Серийний номер. :		Дата виготовлення :			
THE CAPACITY, CURRENT AND POWER INPUT ARE FOR THIS UNIT CONNECTED TO THE FOLLOWING INDOOR UNITS. ПРОИЗВОДИТЕЛЬНОСТЬ, ТОК И ПОТРЕБЛЯЕМАЯ МОЩНОСТЬ ДАННОГО БЛОКА ПРИ ЕГО ПОДКЛЮЧЕНИИ К СЛЕДУЮЩИМ ВНУТРЕННИМ БЛОКАМ. ПРОДУКТИВНІСТЬ, СТРУМ ТА СПОЖИВАНА ПОТУЖИВІСТЬ ДАНОГО БЛОКУ ПРИ ЙОГО ПІДКЛЮЧЕННІ ДО НАСТУПНИХ ВНУТРІШНІХ БЛОКІВ. 4-Way Cassette, 56 type x 2 /4-стороння кассета, 56 тип x 2 /4-стороння кассета, 56 тип x 2 FOR OTHER COMBINATIONS, REFER TO MANUAL. ИНФОРМАЦИЮ ПО ДРУГИМ КОМБИНАЦИЯМ СМОТРИТЕ В ИНСТРУКЦИИ. ЗА ІНФОРМАЦІЄЮ СТОСОВНО ІНШИХ КОМБІНАЦІЙ ЗВЕРТАЙТЕСЯ ДО ІНСТРУКЦІЇ. Authorized representative in EU Panasonic Marketing Europe GmbH Panasonic Testing Centre Winsberg 15, 22525 Hamburg, Germany					
Panasonic Corporation 1006 Kadoma, Kadoma City Osaka, Japan					Made in China Сделано в Китае Вироблено в Китаї Fabricado en China

Tabulation of Various data

A	U-4LE1E5	U-5LE1E5	U-6LE1E5
B	220 – 240 V ~ 50 Hz		
C	4.84 kW, 21.0 A	5.64 kW, 24.5 A	6.45 kW, 28.0 A
D	25 A	35 A	35 A
E	3.80 MPa		
F	2.70 MPa		
G	3.5 kg	3.5 kg	3.5 kg

A	U-4LE1E8	U-5LE1E8	U-6LE1E8
B	380 – 415 V ~ 50 Hz		
C	5.62 kW, 8.5 A	6.61 kW, 10.0 A	7.94 kW, 12.0 A
D	20 A	20 A	20 A
E	3.80 MPa		
F	2.70 MPa		
G	3.5 kg	3.5 kg	3.5 kg

Compliance with regulation 842/EC/2006 Article 7(1) requirements

EN

DO NOT VENT R410A INTO THE ATMOSPHERE: R410A IS A FLUORINATED GREENHOUSE GAS, COVERED BY THE KYOTO PROTOCOL, WITH A GLOBAL WARMING POTENTIAL (GWP) = 1975.

Conformité aux exigences de l'article 7 (1) de la réglementation 842/EC/2006

FR

NE PAS METTRE LE R410A À L'AIR LIBRE: LE R410A EST UN GAZ À EFFET DE SERRE FLUORÉ, RÉGULÉ PAR LE PROTOCOLE DE KYOTO AVEC UN POTENTIEL DE RÉCHAUFFEMENT DE LA PLANÈTE (GWP) = 1975.

Kompatibilität mit den Anforderungen der Vorschrift 842/EC/2006, Artikel 7 (1)

DE

R410A NICHT IN DIE AUSSENLUFT ABLASSEN: R410A IST EIN FLUORIERTES TREIBHAUSGAS, DAS IM KYOTO-PROTOKOLL ENHALTEN IST UND EIN ERDERWÄRMUNGSPOTENTIAL (GWP) VON 1975 AUFWEIST.

Osservanza delle richieste dell'Articolo 7(1) delle regolamentazioni 842/EC/2006

IT

NON DISPERDERE R410A NELL'ATMOSFERA: L'R410A È UN GAS FLUORATO CAUSA DI EFFETTO SERRA E COPERTO DAL PROTOCOLLO DI KYOTO CON UN POTENZIALE DI RISCALDAMENTO GLOBALE (GWP) = 1975.

Conformidade com o regulamento 842/EC/2006 Requisitos do Artigo 7(1)

PT

NÃO DEIXE O R410A ESCAPAR PARA A ATMOSFERA: O R410A É UM GÁS FLUORADO COM EFEITO DE ESTUFA, REGULADO PELO PROTOCOLO DE QUIOTO, COM UM POTENCIAL DE AQUECIMENTO GLOBAL (GWP) = 1975.

Συμμόρφωση με τις απαιτήσεις του κανονισμού 842/EC/2006 Άρθρο 7(1)

GR

ΜΗΝ ΑΠΕΛΕΥΘΕΡΩΣΕΤΕ ΤΟ R410A ΣΤΗΝ ΑΤΜΟΣΦΑΙΡΑ: ΤΟ R410Α ΕΙΝΑΙ ΦΘΟΡΙΟΥΧΟ ΑΕΡΙΟ ΘΕΡΜΟΚΗΠΙΟΥ ΠΟΥ ΚΑΛΥΠΤΕΤΑΙ ΑΠΟ ΤΟ ΠΡΩΤΟΚΟΛΛΟ ΤΟΥ ΚΥΟΤΟ, ΜΕ ΔΥΝΑΜΙΚΟ ΠΛΑΝΗΤΙΚΗΣ ΑΥΞΗΣΗΣ ΤΗΣ ΘΕΡΜΟΚΡΑΣΙΑΣ (GWP) = 1975.

Cumplimiento de los requisitos del Artículo 7 (1) de la Directiva 842/EC/2006

ES

NO LIBERAR R410A AL AIRE LIBRE: EL R410A ES UN GAS FLUORIZADO DE EFECTOS DE INVERNADERO, INCLUIDO EN EL PROTOCOLO DE KYOTO, CON UN POTENCIAL DE CALENTAMIENTO GLOBAL (GWP) = 1975.

Voldoet aan de eisen van regeling 842/EC/2006 artikel 7(1)

NL

LAAT R410A NIET ONSNAPPEN IN DE DAMPKRING: R410A IS EEN FLUORHOUDEND BROEIKASGAS ZOALS BEDOELD IN HET KYOTO PROTOCOL, MET EEN AARDOPWARMINGSVERMOGEN (GWP) = 1975.

Съответствие с изискванията на 842/EC/2006 член 7(1)

BL

НЕ ИЗПУСКТАЙТЕ R410A В АТМОСФЕРАТА: R410A Е ПАРНИКОВ ГАЗ, СЪДЪРЖАЩ ФЛУОР, ВКЛЮЧЕН В ПРОТОКОЛА ОТ КИОТО С ПОТЕНЦИАЛ ЗА ГЛОБАЛНО ЗАТОПЛЯНЕ (GWP) = 1975.

Соответствие требованиям Статьи 7(1) правил 842/EC/2006

RU

НЕ ДОПУСКАЙТЕ ВЫБРОСОВ R410A В АТМОСФЕРУ: R410A ЯВЛЯЕТСЯ ФТОРИРОВАННЫМ ПАРНИКОВЫМ ГАЗОМ, ОХВАТЫВАЕМЫМ КИОТСКИМ ПРОТОКОЛОМ, С ПОТЕНЦИАЛОМ ГЛОБАЛЬНОГО ПОТЕПЛЕНИЯ (GWP) = 1975.

Згідно норм 842/EC/2006 стаття 7(1)

UK

НЕ ВИПУСКАЙТЕ R410A В АТМОСФЕРУ: R410A – ФТОРОВМІСНИЙ ПАРНИКОВИЙ ГАЗ, ЩО ПІДПАДАЄ ПІД ДІЮ КІОТСЬКОГО ПРОТОКОЛУ, З ПОТЕНЦІАЛОМ ГЛОБАЛЬНОГО ПОТЕПЛІННЯ (GWP) = 1975.